The BOOK *of* KNOWLEDGE

The Children's Encyclopedia

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DEPARTMENTS

The Earth
Stories and Legends
All Countries
Golden Deeds
Helps to Learning
Literature
Animal Life
Famous Books
Dominion of Canada
The United States
Familiar Things
Our Own Life
The Fine Arts
Men and Women
Poetry and Rhymes
Plant Life
Things to Make
and Things to Do
Book of Wonder

VOLUME XIX

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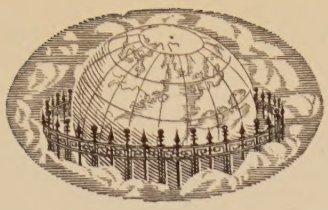

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Photo, Shiplers. **Great Shoshone Falls of the Snake River in Idaho.**

THE WESTERN STATES

PART II

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WEST of the Rocky Mountains there is a large plateau and basin country (Columbia Plateau, Great Basin, Colorado Plateau) which receives even less rainfall than the plains just to the east of the Rockies. This arid region of vast extent lies between the Rockies on the east and the Cascades and Sierra Nevadas on the west. The region covers all or parts of the states of Nevada, Utah, Oregon, Washington, Idaho, Colorado, Arizona and California.

Most of the Great Basin is in Nevada and Utah. It is called a basin because the streams which rise within it or flow into it never reach the sea. For example, the great Humboldt River becomes smaller and smaller as it enters the Basin, and finally is lost in the desert sands, except for a few low places in the ground which it fills with water. This is called Carson Sink. The lakes vary in size with the amount of water which the river brings down to them. A few disappear entirely for several weeks at a time. The mud then dries out and great cracks form, often an inch or more in width. Such a "lake" is called a "playa lake." Most of the permanent lakes here are salt lakes, and some are so laden with salt that it is impossible for a person to sink in the water. Great Salt Lake in Utah is the largest salt lake in the Basin country. The rivers carry salt into the lakes, and the hot sun and desert winds evaporate the water. The salty material is left behind, and the water that remains gets saltier and saltier every year.

In this arid region the winds pick up the sand and blow it about, here forming hills and there covering the whole surface. Trails, roads and railroad tracks are often buried beneath the sand. The most arid part of the Basin is Death Valley, a name which tells us how desolate the place must be. A few crops are raised in the Great Basin, some by dry farming and some by irrigation. The Truckee-Carson project is the largest irrigated region in the Great Basin. Most of the area of the Great Basin must always remain uncultivated because of the lack of water. This is another way of saying that the land will never have a large population.

Why do any people live in the Great Basin at all, you may wonder. Mining is the main answer. Tonopah and

Goldfield are towns near places where gold has been found in large quantities. When the news of the discoveries in California reached the East, hundreds of men started across the country and became part of the great gold rush of 1849. On the way to California people found gold in Nevada. In the higher places in the Basin there is enough grass to permit a good deal of grazing. The grass is too short for large animals like cattle, but sheep with their small mouths can get close to the ground and eat the small blades of grass. Sheep, too, can go without water for a longer time than can cattle. Vast flocks of sheep range over the Utah section of the Basin. Some of the wool that goes into our clothing grew on the backs of sheep raised in the semi-arid parts of western United States.

Nevada has fewer people for every square mile than any other large area in the United States. Eighty-nine of the cities of our country have a population greater than that of the whole state of Nevada. The population of this state has been growing smaller for the last few years.

THE COLORADO PLATEAU AND THE GRAND CANYON

The Colorado Plateau, which is south of the Great Basin, is also sparsely settled. The greater part of this plateau is in Arizona, but it extends also into southern Utah, Colorado, Nevada and California. Much of the Plateau, like the Basin, is arid. It is called a plateau because it is high above sea-level and is cut up by deep canyons. The Colorado River rushes along with great speed at the bottom of the Grand Canyon, which is the deepest canyon in all the world. If you have never seen the Grand Canyon you can hardly imagine how big it is and what it looks like. In some places it is a mile deep, and a mile "up and down" seems a much greater distance than a mile on the level ground. At the widest place it is twenty-five miles wide, sloping down to the narrow bed of the river at the bottom, so far below. The river, which looks like a bit of ribbon at the bottom of the canyon, has done this giant work through uncounted years. Rushing along, it gradually wore away bits of the rock and carried them with it down to the sea. Year after year, for thousands and hundreds of thousands of years, through layer after layer of rock, it has cut itself down and down to the depth where we now see it. The layers of rock are of many different colors, making the canyon a beautiful picture, changing and changing again as the light shines here and there upon it, or the clouds throw shadows, or snow throws a blanket of white over the level places. For you see each side of the canyon looks like a staircase such as a giant might need if he wanted to climb from the river's bed to the top of the Plateau. Each "step" is a layer of rock. No railroads cross the Canyon, nor is it likely that any ever will. Some tasks are too great, and this is one of them.

THE COLUMBIA RIVER PLATEAU AND THE ROCKS

Now let us imagine that we are suddenly taken from this great work of Nature to the country north of the Great Basin, in eastern Oregon, Washington and northwestern Idaho. We should now be on another plateau which covers as large an area as the whole state of New York and the New England states together. This vast plateau is called the Columbia River Plateau because the Columbia River cuts across it in a deep canyon.

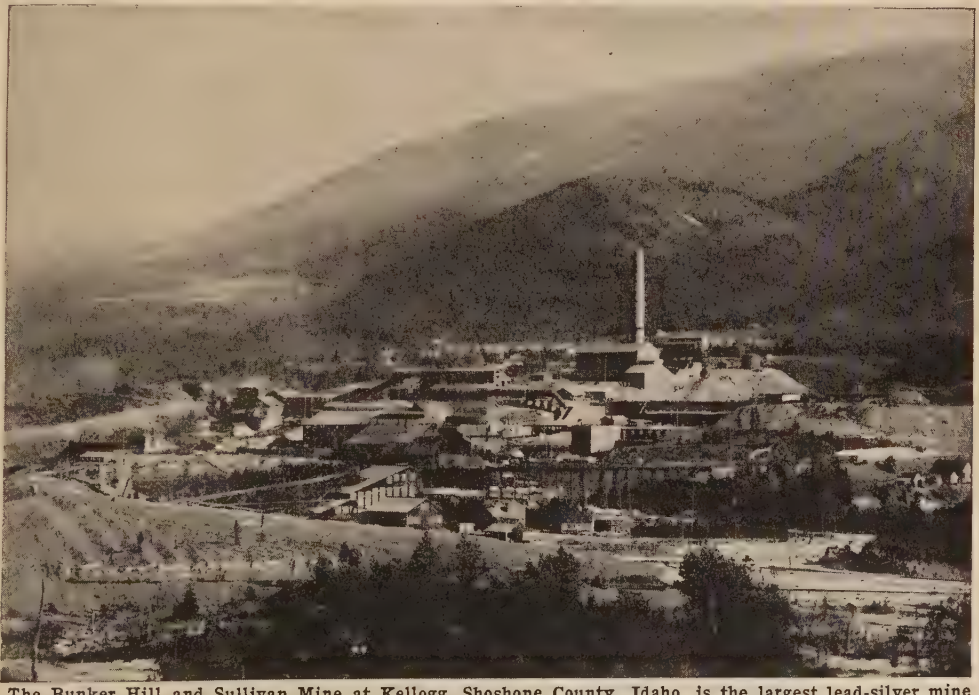
The rocks of this plateau are lava rocks. Long, long ago they were in a hot, soft condition deep down below the earth's surface and were poured out through cracks in the crust. Then they cooled and hardened. Thus they became solid rock, and after many more years the rock began to crumble on the surface, forming a fertile soil. Where there is water for irrigation fine crops are raised. Wheat is a great crop of the Columbia Plateau, and the yield is higher than in any other wheat-growing state. Spokane, on the Spokane River, is the chief city of this region.

WHAT ONE SEES IN A TRIP DOWN THE COLUMBIA RIVER TO PORTLAND

Following the Columbia River, we should be heading west to the Pacific Ocean. The car window would frame an ever-changing beautiful picture. Here are great terraces of flat benches high above the river along which the towns are built. There the great river rushes through a narrows and again it flows peacefully along with little motion. About 150 miles from the ocean the train goes through a great gap in the Cascade Mountain Range. Not far distant are Mounts Hood and Rainier (also called

GOLD AND SILVER FROM THE DEPTHS

When gold was first discovered in California placer mining was the rule. That is, the gold was separated from the sand and gravel by washing. Now the greater part of the product comes from deep mines driven into the western slopes of the Sierra Nevada. This is a mine at Chinese, Tuolumne County.



The Bunker Hill and Sullivan Mine at Kellogg, Shoshone County, Idaho, is the largest lead-silver mine in the world, and is said to be the only one where all the operations—mining, smelting and refining—are conducted in a single plant. There are over fifty-five miles of underground tunnels in this mine, and the ore-vein has been followed for 4,300 feet.

Photo, courtesy Walter C. Clark.

SALT LAKE CITY AND SPOKANE

Temple Block, the sacred square of the Mormons, is the centre of Salt Lake City. The building with the spires is the Temple. The Tabernacle beyond, with the flat dome, can accommodate 12,000 people. Services are held here regularly. To the left is the smaller Assembly Hall. Photo, Shiplers.

Spokane, Washington, sprang up as if by magic, but is being built to endure for centuries. The city lies on both banks of the Spokane River, and two falls with a combined drop of 150 feet furnish much power for industries. This is the Monroe Street Viaduct, and beneath you can see a plant generating electric power. The residence quarter of the city is unusually attractive.

Photo, courtesy Denver Tourist Bureau.
Denver is the principal gateway to the Rockies, and from the city twelve of the national parks can be easily reached. The city had a population of 256,491 in 1920 and is growing. This is a view across the Civic Centre, with the mountains in the background. It adjoins the Capitol grounds.

Los Angeles, the largest city in the Far West, is known all over the world as the centre of the moving-picture industry, but the city is also attractive to the home-seeker and the investor. This is Pershing Square, one of the beauty spots of the city, with the Biltmore Hotel on the left.

Mount Tacoma) with their snow-covered peaks, but they cannot be seen from this point. So gradually that the traveler hardly notices it the land has become more thickly clothed with vegetation, until the trees are now quite large. The reason is, of course, that there is greater rainfall here. If we were descending the river valley on a winter's day we would very likely have noticed the change in weather, for most of the rain in this region comes during the winter months. The winds, blowing from the ocean and laden with water-vapor, when they pass up over the mountains are cooled by expansion, and the water-vapor is changed into rain and snow. The winds are stronger in the winter time in Washington and Oregon and California.

Those curious machines built from the river bank out into the water are used for catching salmon as the fish in great numbers swim up the river from the ocean. Small fishing villages are located on the banks, and we see canning factories, where the salmon are packed in cans to be shipped all over our country and perhaps to foreign countries.

PORTLAND, OREGON, AND REASONS FOR ITS IMPORTANCE

Finally Portland, Oregon, is reached. This city, though over a hundred miles from the sea, is an ocean port. The Columbia River through the ages had carried down to the sea great loads of mud and sand which were dropped at the point where ocean-water halted the river's current. It has cost millions of dollars to cut and maintain a channel deep enough for large ocean vessels through these sand bars. To-day Portland is one of the leading ports of the North Pacific. In the harbor are to be seen ships flying flags of European countries, and, what is even more interesting, many ships are carrying the flag of Japan. There are two main reasons for the rapid growth of the city. In the first place, China and Japan are doing more trading than formerly, which gives much extra commerce to Portland. The second reason is the Panama Canal, over 2,500 miles away. Before there was a Panama Canal articles produced in the West were carried east on freight trains. Now such products are being sent by train to Portland and other Pacific-coast ports, and there are loaded on ships which go to New York and other eastern ports through the great canal. The cost of shipping the goods is somewhat cheaper by this route, though it is many miles longer.

THE PUGET SOUND COUNTRY TO THE NORTH

A trip 150 miles north along the Cowlitz River and beyond will take us to the Puget Sound country. On this trip we see the landscape of a rainy country. Instead of the bare ground to which we have become accustomed in most of the West, there are large trees (except where they have been cut down) and thick underbrush. Relatively flat land stretches away to the high mountains in the far distance. Here and there are open spaces where we see large fields of blackberries, loganberries, raspberries and many other small fruits. In the towns and villages along the way are the preserve factories where the fruits are canned and shipped away for people to enjoy in far-off towns and cities.

The Puget Sound country is a great lowland region surrounded, except on the ocean side, by towering snow-capped mountains. There are many attractive towns and cities in the lowland. The most important are Seattle, Tacoma, Olympia, Port Townsend, Everett and Bellingham. Seattle, which is the metropolis of this region, is a fast-growing port city. Most people think that the deeper a harbor is, the better it must be, but the harbor of Seattle is actually so deep that the anchor-chains of many vessels are not long enough to reach bottom! This great depth of the harbor has also made the building of wharves very expensive. Seattle is three days nearer to the ports of Japan than is San Francisco. If you look closely at a globe-map of the world showing the routes that vessels take across the Pacific, and think hard, you can find out why this is true.

WHAT THE TOURIST SEES IN A TRIP SOUTHWARD FROM PORTLAND

Perhaps we shall go back to Portland and take a trip south from that city. This will take us up the broad valley of the Willamette River. The country here is very similar to that north of Portland. Gradually it becomes more mountainous, and then for three hundred miles the train winds through the valleys and passes of the Klamath Mountains. The mountains of the Pacific coast form a great letter H. Each of the lines in the H

FOUR IMPORTANT WESTERN CITIES

The Civic Centre of San Francisco is a most impressive group of buildings. To the right is the magnificent new City Hall which replaces the old one destroyed by fire in 1906.

On the left is the Columbia River Highway; the centre is a street scene in Portland, Oregon; and the right is the principal street in Reno, Nevada. Photos, Portland, by Prentiss; Reno, copyright, Ewing Galloway.

Photos, B. A. Cuttle.

Seattle, Washington, is the largest city of the Northwest and has had a phenomenal growth. The harbor is excellent. To the extreme right is the County-City Building, with the tall L. C. Smith Building beyond.

represents mountains, while the spaces in between represent the lowlands. The top space is the Puget Sound–Willamette Lowland. The line on the east is the Cascade Mountains, and the line to the west corresponds to the Coast Ranges and Olympic Mountains. Our train is now crossing the bar of the H—the Klamath Mountains. Finally the train begins to go downhill, coming out of the mountains and forests and following the valley of the Sacramento River into the bottom space of our letter H. This is the Great Valley of California, so named because it is very long and wide.

THE GREAT VALLEY OF CALIFORNIA

Here is another irrigated country. Seeing oranges and olives growing out in the open, you are surprised to learn that you are as far away from the Equator as central Illinois or Philadelphia. But the winters are much warmer here than in these regions because of the warm winds that blow in from the Pacific Ocean. At the mouth of the Sacramento River a great deal of rice, a semitropical plant, is grown.

The Great Valley is one of the finest agricultural regions in the whole world, but the people who first came here were attracted by reports of gold. When rumors of this easily gotten wealth reached the East in 1849, thousands of people headed for California, either taking the route across the country or making the trip of thousands of miles around Cape Horn in ships. San Francisco grew from a small city of 1,000 inhabitants to over 15,000 in less than a year, and other places, too, grew rapidly.

THE IMPORTANCE OF AGRICULTURE COMPARED WITH GOLD-MINING

Gold is still mined in California, but agriculture is now much more important than the mining industry. The irrigated fields of the Great Valley are occupied by two classes of crops—the fruits and the vegetables. The latter are called truck crops and include, besides many others, celery, lettuce, spinach and asparagus. A large proportion of the vegetables is canned because the fields are so far away from the large markets of the East. Almost every type of fruit is raised in the Great Valley. The train, as it goes down the Sacramento Valley and then up the San Joaquin River, passes through orchard after orchard of oranges, prunes, apricots, pears, and through many fields of smaller fruits, such as strawberries and raspberries. Vineyards are common, especially near Fresno, where more than two-thirds of the raisins of the world are grown. The summer climate of this region is so dry and cloudless that it is safe to put the grapes and other fruits out into the sun with little fear of damage. If rain threatens at this time, there is a great concern among the growers, because partially dried fruit quickly spoils if drenched with water.

In between the long ranges of the coastal mountains south of San Francisco there are many productive valleys which rank high among the garden spots of the world. The most famed of these valleys are Santa Clara, Salinas and Napa. These valleys are nearer the sea than the Great Valley, and receive the benefit of the ocean winds, which make the summers somewhat cooler than in the interior. The people who live in these valleys like to tell tourists how much better the climate of their region is than that of any other part of the country. There is certainly much truth in the glowing accounts of the climate of all parts of central and southern California. Thousands of people have left eastern cities to make permanent homes in California, and thousands more spend part of the year there. Besides these, many tourists go to California to enjoy its many attractions.

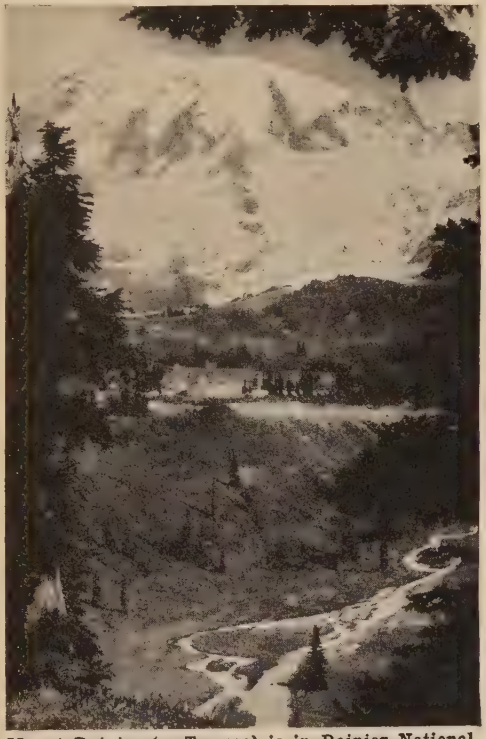
San Francisco, built on a point of land between San Francisco Bay and the ocean, has come to be a great tourist city. Just across from it there is another point, and the passageway thus formed, through which ships from all over the world sail from the ocean into the harbor, is called the Golden Gate. A scene which is not soon forgotten may be viewed by the fortunate traveler, late in the afternoon, looking out across the bay to the Golden Gate and beyond, where the great red sun apparently drops into the Pacific Ocean. Many beautiful towns are near by. The chief ones are Berkeley, Oakland and Alameda. Still farther away are Stockton and Modesto. These cities get their drinking-water from the far-away mountains.

LOS ANGELES, THE LARGEST CITY OF THE WESTERN STATES

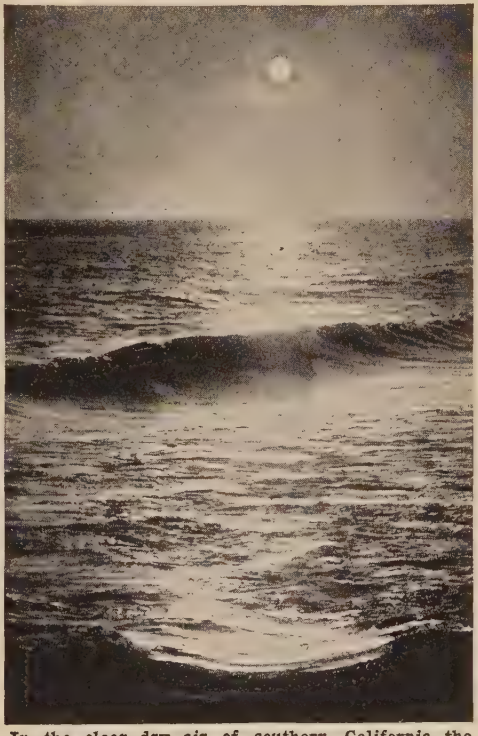
The great city of southern California is Los Angeles. This is one of the most

Golden Gate is the entrance from the ocean to San Francisco Bay. The sunset through it is a sight to be remembered.

The Great White Throne in Zion National Park in southern Utah. This immense park has not yet been entirely explored.



Mount Rainier (or Tacoma) is in Rainier National Park. The glaciers are only one of the many attractions of the park.



In the clear dry air of southern California the moonlight as seen over the calm Pacific Ocean is particularly attractive.

Photo of Mount Rainier, copyright, Ranapar Studio; Moonlight, by Putnam Studios.

rapidly growing communities in the United States. The tributary country, and especially the Imperial Valley, in southeastern California, is a region of great natural wealth. Los Angeles was at one time without a port, but it now has the port of San Pedro, which was of very little account until the larger city improved the surroundings. Los Angeles is the centre of the moving-picture industry, and we cannot doubt that its bright, warm climate was the chief factor in attracting this important industry there. Health-seekers in large numbers have also gone to live in Los Angeles and its surrounding country. Not far from the metropolis are the beautiful cities of Pasadena, Riverside and Redlands. Still farther south, on the coast, is San Diego, whose beautiful surroundings and excellent harbor attract many tourists and much trade. Frequently the Pacific Fleet of the United States Navy manœuvres in and near the harbor of San Diego.

This relief map of California shows the Great Valley, which is one of the finest agricultural regions in the world. Other features of the geography of the state may also be seen if your eyes are sharp.

Lemon orchards lend a distinctive appearance to the country about the city.

Some of the Natural Wonders of California

California offers many natural wonders to the tourist. Few there are who do not go to see the Big Trees. Some of these were "big trees" hundreds of years before any white people came to America. Most of the larger trees have been preserved from possible destruction at the hands of lumbermen by the creation of Sequoia National Park. The Yosemite National Park is another place sought by tourists. Most people are familiar with pictures of the beautiful falls to be seen there, or of El Capitan, that silent watchman of solid rock, which overlooks the scene. Still farther north in the Sierras there is Lassen Peak—the only active volcano in the United States. Frequently smoke and cinders issue from its summit. The Sierra Nevada Mountains have all the kinds of wild beauty that any mountains can have, and the Klamaths are nearly as beautiful. California is a good place to end our tour of the Western states because it has so many varieties of scenery. The whole West, as we have seen, is like California in being a varied country. Somewhere in the Western states may be found every possible natural condition and almost every occupation which the ingenuity of man has yet devised. As yet the West as a whole is sparsely populated. With the rapid increase of population manufacturing is sure to develop upon a much greater scale than heretofore.

THE NEXT STORY OF THE UNITED STATES IS ON PAGE 7105.

Sound waves passing up Organ pipe
Front half of Organ pipe and Gas Burner cut away
Four-sided Mirror rapidly revolving and reflecting the jumps of the flame
Thin disc vibrated by the note and causing the flame to jump up and down
The Mirror showing its shape, also absence of effect when it is not revolving
Pipe conveying Gas

Resonators have been devised with the object of making sound-waves visible. In the type shown above a gas flame is made to rise and fall by the vibrations of musical notes. A four-sided mirror is kept revolving, and in this the flame is seen as a rapid succession of flickering tongues.

THE BEHAVIOR OF A SOUND

CONTINUED FROM 6700

WE have been reading of music; let us go a little more carefully into the question of overtones, or harmonics. We can study it very well by taking a single string stretched between two points over a sounding-board. That is practically the same as a violin with a single string. Everyone knows that a violin string may be sounded by being plucked with the finger, or by being played with a bow; and we all know that the kind of sound produced by bowing is vastly different from the sound produced by plucking.

This is quite apart from the length of the sounds, for a clever violinist can produce exceedingly short sounds with his bow, and yet these, though of the same pitch and loudness and length as when the string is plucked, are utterly different in quality. We know already that this difference must be a difference in the overtones, and so it is.

Our ear tells us that the sound made by the bow is richer and more lovely than the sound made by plucking, and this is because the bowing throws the string into vibrations in little pieces, so to speak, as well as over its whole length. These partial vibrations produce the overtones which make the richness of the sound. So here we observe that a string behaves in two very different ways. When a piano or a violin string is struck or plucked there is produced what is called a free vibration. The string is disturbed for a moment; then the thing which disturbs it is removed, and the string vibrates freely for a greater or less time—a long time in the case of a piano, a short time in the case of a violin.

In a piano, for instance, the strings are always meant to be played in this way, and everything is done to make the tones as rich in overtones as possible, even though they belong to the class of free vibrations. Resonators, for instance, are used to give back sympathetic vibrations to any particular tone, and to help to magnify the sound; but, quite apart from resonators, the kind of string makes a great difference. We know that the pitch of a note depends on the tightness of the string, which is what the tuner corrects when he tunes the piano; it depends also on the mass of string, and on its length.

Plainly, therefore, it should be possible to get one and the same note from a long thin string and from a short

thick one, and this can actually be done; or, rather, it will be one and the same fundamental note in both cases, with a difference when it comes to the question of overtones. Then we find that, though the two strings produce the same fundamental note, it is a richer and more beautiful note when it comes from a longer, thinner string than when it comes from a shorter, thicker one.

WHY A GOOD PIANO MAKES BETTER MUSIC THAN A BAD ONE

Everyone knows how utterly different is the sound of the bass notes of a good piano and the same notes of a cheap one. One of the chief differences is that the good piano uses longer wires to produce the low notes. Two pianos of the same size may be very different in the quality of their lower notes, and when we open the pianos we find that in the better one the longer wires have been run at an angle across the shorter ones, so that greater length has been obtained. That is what is meant when it is said that a piano is overstrung, as all but the cheapest pianos are nowadays. The point about overstringing is to get length of string, and the point about length of string is that this is the best way of making low notes.

It is difficult to say exactly what happens when a string vibrates and produces overtones. We know that, in the first place, the whole string is swinging from side to side, and then it seems that, on the top of that swing, various sections of the string are also making little swings of their own, each of a certain rate, according to the length of string that is swinging. So, overtones are made.

When a string is bowed it is made to vibrate in a different way, and in this case it vibrates only when the bow is being drawn across it, and stops immediately afterward. It vibrates only when the bow forces it to vibrate, and so these are called forced vibrations, as distinguished from free vibrations.

THE VIOLIN STRING THAT CAN BE MADE TO LAUGH OR CRY

The difference between a good artist and a poor one is very great, and this is true though the violins may be the same. The secret lies in the bowing of the great player. When he plays a single long note, it is a single note, and yet it is many notes; he can make the string laugh or cry at will.

The reason is to be found in the extraordinary sensitiveness of a string undergoing forced vibration. Changes in what the bow does to the string, so minute that no one can describe them or define them, or say where they begin or end, or what they consist of, will greatly affect the quality of the sound. The reason, of course, is that the string is vibrating in a different way, and so is producing a different set or a different proportion of overtones in addition to its own proper note, which does not change except when the string is stopped. And the virtue of the good violin is that the body of it is somehow so made as to respond to the behavior of the string as sensitively as the string responds to the bow.

There is a very interesting experiment which anyone can make with a good piano. As a rule, when we play a note on the piano, no other note has much chance to sound, because the dampers are resting on them. When we hold a note down we raise the damper.

Let us, then, hold down the following notes, not striking them, but raising the damper, so that if anything makes the string vibrate, it shall be free to do so: C in the bass clef, the C above that, the E, G, and B flat above that. When we have done this, let us strike loudly the low C below the bass clef, and let it go. If it is a good piano we shall now hear a soft, sweet chord made up of the five notes which we have held down but did not strike. Something has struck them, and the explanation of this is very interesting.

WHY THINGS JINGLE WHEN WE PLAY THE PIANO

The long low string which we struck vibrated not only as a whole, producing the note proper to itself, but also in a number of pieces of various lengths corresponding, as it happens, to the five notes we had previously held down. When the note is struck in the ordinary way, these overtones can be separately distinguished only by well-trained ears, but we have made them stand out in our experiment, because we stopped the loud note when we let go the key we struck.

This did not stop everything, because when the air-waves that made the overtones came each against the piano string that corresponded to the particular overtone, that string was thrown into what is called sympathetic vibration. Other strings are not affected because they can-

not vibrate at that particular rate; but sympathetic vibration means that waves traveling at any rate will set vibrating anything that can vibrate at the same rate. This is the reason that things jingle when we play the piano.

This instance of sympathetic vibration will help us to understand the behavior of resonators. To begin with, we know that some things will resonate and others will not. A clock or a watch has a very different tick when laid on a hard table from what it has when put on cotton batting; and when we want to hear a tuning-fork well, we do not hold it in the air, but press the stem on something firm and hard.

We know that the strings of a violin without the body make very poor sounds; and it is astonishing how poor is the sound of a piano string outside the piano.

THE BEHAVIOR OF A NOTE OF MUSIC OVER A JUG OF WATER

But this must not lead us to suppose that one resonator is as good as another. On the contrary, there are special rates of vibration to which special resonators can respond—rates to which they are sympathetic, we might say, as we saw in the case of the sympathetic vibration of the piano wires. If we take up to a certain height a long vessel holding water, and then sound a tuning-fork and hold it over the vessel, we may find that the sound is immensely enriched and increased. If now we add a little more water, or pour a little out, holding the tuning-fork over the vessel makes no difference in the sound, or only very little.

In this way it is possible to make various kinds of instruments, consisting of a number of resonators arranged in an orderly way. If we have little flames opposite the mouths of these resonators, the flames will flicker when the corresponding resonators are vibrating, and only then. So we can see the overtones, in a sense, and thus can find them out, though we may be unable to detect them by means of our ear. This is called the tuning of resonators, and the first man that really studied it was the great German scientist Helmholtz.

THE WONDERFUL CORDS OF THE HUMAN VOICE

But the tuning of resonators really dates from before the days of Helmholtz, who knew what he was doing, and we, as we tune our resonators every day, which we do, do not know what we are doing. Wonderful though other musical instruments are, and more especially the violin, the voice really surpasses them all, and the reason is that no other instrument has ever been invented in which we can tune the resonators as we go along.

In our experiment with the piano the soft chord we heard really came, in the first place, from the wire which we struck; and, similarly, all the overtones of the human voice, whether in speaking or singing, are produced by the vocal cords. The marvelous richness in overtones of the vibrations of the vocal cords is made yet more marvelous by the fact of their extreme shortness. The vocal cords of a bass singer, say, roughly, an inch long, may rival in number and richness of overtones a violin string many inches long, or a piano string many feet long. Now, the vibrations of the vocal cords are forced vibrations, and we know that, other things being equal, forced vibrations are always richer in overtones than free vibrations.

The chest and the cavities of the mouth and nose make the resonators for the voice, and these differ from all others in that they can be changed from moment to moment, and changed appropriately. For the lower notes the principal resonator is the chest, and its use is in reinforcing the lower overtones. It does this best when it is well expanded, and therefore a singer produces far more resonant low notes when there is plenty of air in his lungs than when the air is nearly all expelled.

A GREAT SINGER'S MARVELOUS POWER OVER LANGUAGE

But all the different qualities of tone that decide which vowel the singer is singing, and, apart from that, control so much the quality of the voice, and its effect on our minds, are due to the higher overtones. These are affected by the upper resonators, the shape of which we can instantly control within a wide range.

From the practical point of view, the power of tuning our resonators is of the greatest importance, because it gives us the power of producing different vowels. Therefore, all the difference between the lowest types of human language, and the higher types of language, rich in vowel sounds, is due to the laws of resonators and the fact that we can tune our resonators as we please.

The good singer goes even farther than the highest language in this respect: he

does everything that the language does, and more. It is true that the bad singer often spoils the vowels of a language and makes them all nearly alike. By so doing he prevents us from understanding the words he sings, and he also loses all the value of variety in vowel tones.

The good singer not only uses variety and makes the most of it, sounding his vowels much more purely than most of us do when we speak, but he also tunes his resonators from moment to moment, so as to make the tone cold or warm.

For this purpose he uses everything that is at his disposal for tuning his resonators. The extent to which the mouth is opened, the exact position of the lips, of the tongue, and of every part of the throat, from its roof downward—all these modify the tuning of the upper resonators, and are under the perfect and easy control of the great singer.

How the overtones are produced in the pipes of an organ

It is not by any means only stretched strings that produce overtones. The same is true of pipes, such as the pipes of an organ, a flute, a clarionet or a bassoon. These vary very much in their quality, and the variations are due to the differences in the overtones. In each case the column of air in the pipe is vibrating not only as a whole from end to end, but also in sections, and thus the overtones are produced.

It is helpful to study the behavior of such a thing as a plate. Many years ago careful study was made of plates clamped in the middle and then made to vibrate by having a bow drawn across the edge. If some fine sand be spread over the plate, we now notice that the sand is thrown into certain patterns, these patterns changing according to the method of bowing.

The sand is thrown from the part of the plate which is vibrating most and will tend to be heaped up on the part which is moving least, wherever that may be. We find, then, that in every case there are certain definite lines on the plate which are moving least, and on which the sand gets heaped. These points are called *nodes,* from a Latin word meaning "knots."

Why vibrating strings move quicker in some parts than in others

But the importance of nodes is not only due to the fact that we find them in the case of plates. When we carefully study a stretched string we find that there are certain places along the length of the string where it moves least, and these are the nodes. We know that the string is always moving as a whole; but, apart from that, it is also moving in pieces, producing the overtones, and these pieces lie between the places where the nodes form. The simplest and commonest overtone in the case of any string is, we find, one that is just an octave higher.

We have already learned the rule about the vibration of a string, that the shorter it is, the quicker it vibrates, other things being equal. So when the overtone is an octave above the fundamental tone, it must be that the string is vibrating in half its length as well as its whole length. Half the length will mean double the number of vibrations in each second, and that will just make the octave. We should expect, then, to find a node formed halfway along the string, and so it is. Other nodes also form, corresponding to the particular overtones in each case.

Of course, in the case of very high overtones it must mean that the string is being cut up, so to speak, into a large number of small lengths, small enough to correspond to the high pitch of the overtone; and this is so.

The complicated sound-waves produced by an orchestra

We know that the loudness of a sound depends on the width, or *amplitude,* as it is called, of the swing of the air-waves, and that depends, of course, on the width of the swing of the thing that makes the air-waves. So, in this case we should expect that if the swing of the pieces of the string gets smaller the shorter they are, the overtones must get fainter the higher they are; and that is what happens.

We must not allow our minds to be confused with the idea that somehow or other it is possible for any particles of air or any parts of a string to be in two places at the same time. And so, when a string is vibrating so as to produce both a fundamental note and also several overtones, it is not really doing any of the things that we fancy it does, but something which is the result of all of them. No part of it can be in two places at the same time, and the actual movement of the string is an immensely complicated one.

This becomes still more extraordinary and difficult to understand when we try to imagine how complicated must be the

sound-waves produced when a number of instruments and voices are all sounding together. The wave which reaches the ear is an immensely complicated sort of blend, or compromise, between all the different kinds of waves that have been produced. A very interesting way of studying sound-waves is to be found in the talking machine, about which we read on page 261.

We can make the phonograph record the waves corresponding to an orchestra or to any kind of sound, simple or complicated, music or mere noise, and the marks made on the wax by the phonograph needle can be studied by means of the microscope, or they can be photographed and greatly magnified.

There is an interesting way of studying sound by turning it, as it were, into something that can be seen. We saw this, also, in the case of the flames which were made to flicker when the resonators opposite them were thrown into action.

TYNDALL'S VOWEL FLAME THAT RESPONDS TO HIGH NOTES

Professor Tyndall invented what he called a "vowel flame," which, when nothing disturbs it, is about two feet high, but certain sounds will make it so short that it can scarcely be seen, and then, when the particular sound stops, up it will jump again. It is called a vowel flame because it can tell one vowel from another, so to speak. The flame is specially sensitive to high notes, and is therefore much more affected by vowels which are made by high overtones than by those which have lower overtones.

The highest pitched of the vowels is *e*. Anyone who will whisper the various vowels all on the same note will agree with this, and there will be no doubt that, though they are all on the same note, yet *e* is the highest of them all. The reason is that, though the fundamental note is the same for each of the vowels as we are whispering them, the overtones of *e* are the highest. Now, if we say *oo* (as in *boot*) to the vowel flame, it will do very little; but if we say *ee* (as in *feet*) to it it will almost disappear. When we stop, it jumps up again.

Sensitive flames can be used for more strictly scientific purposes. We have seen already that they can be made to show which of a set of resonators is being thrown into action by a certain sound. This test can be applied to the study of sounds, notably to the study of the vowel sounds, which are more numerous than may be supposed by anyone who speaks only one language. When we learn French we all know how different some of the vowel sounds are, and really the total number of possible vowel sounds is very large.

HOW MEN CAN WATCH A SOUND PLAYING WITH FIRE

This is entirely a matter of the overtones, and they can be studied by speaking into a little machine in such a way as to affect a flame, and we can study the shape which the flame takes in different cases. In fact, we may say that we can actually watch a sound playing with fire! There is a likeness between the shape of the flame in such cases and the shapes of the marks which the same sounds make on wax by means of the phonograph.

When a wave strikes a breakwater and comes back again and meets the next wave, the two will clash and interfere with each other. At times the two crests will come together and make a very high crest; at other times the crest of one wave will meet the trough of another, and each will tend to spoil the other. This effect of one wave on another is called interference, and it is true of all kinds of waves.

We can study interference in a small way by throwing two stones into a pond, and seeing what the one set of waves does to the other. Interference in sound-waves produces a most interesting result. It means that if we have sounding together two notes very near in pitch, but not the same, the waves will interfere with each other, and we shall get what are called beats; the sound will seem to throb, or beat. When the two waves are helping each other, the sound gets louder; when they are spoiling each other, the sound is fainter. This beat is very unpleasant.

HOW CERTAIN DISCORDS MAY BE USED TO IMPROVE HARMONY

Part of the objection to what we call discord is that the waves made by the various notes are capable of interfering with each other, and so we get beats, or throbs. But different people vary very much as to what they like in the way of discords, and the right use of certain discords in music is invaluable because it enormously increases the effect of the harmony on our ears.

THE END OF THE BOOK OF THE EARTH.

CONTINENT OF SOUTH AMERICA

This bird's-eye view of South America shows the countries, chief towns, mountains and rivers. You will notice that the country drains chiefly into the Atlantic Ocean, the Andes forming a great and continuous watershed. Three great river systems, those of the Orinoco, Amazon and La Plata, carry off most of the water to the sea.

An Inca throne at Cuzco, Peru, facing the rising sun, and carved out of the solid mountainside.

SOUTH AMERICA AND ITS CONQUERORS

CONTINUED FROM 6814

LLAMA

BEFORE we commence to read the story of South America let us for a moment look at the map. If we study it for a little, it will add greatly to our interest, for the geography of the continent has had a great deal to do with its history.

The first thing that strikes us is the strange likeness between the southern continent and our own continent of North America. Both have the same triangular shape, both have high ranges of mountains along the western coast, both have mountains in the east and a great central plain. It is believed by geologists that more than once this central plain sank beneath the ocean, and that only the mountains of Brazil and of Guiana and part of the Andes rose above the water. How many thousands or millions of years the waves of the Atlantic washed the mountains we do not know. Then the land slowly rose again, the Andes pushed their way high up toward the clouds, the low land was slowly drained, and luxurious vegetation sprang up and covered the plains.

In the northern part of the continent the Andes are divided into three distinct ranges, with high valleys between. Farther south they form but two chains, or cordilleras, with a central valley, and in the extreme south they consist of one range, which ends abruptly at the southern end of the island of Tierra del Fuego. The mountains are nowhere more than fifty miles from the coast, and, in fact, on a clear day they are distinctly visible from the deck of a coastwise steamer. For over two thousand miles practically no rain falls between the mountains and the sea. The sides of the Andes, which are the youngest mountains in the world, are very steep. Consequently the western rivers are very rapid. When the snow melts, the water rushes down in torrents, to be lost in the sand or the sea, and in a short time many of the river beds are dry. In the rainless region long stretches of the coast land are desert; and only where irrigation is possible is any vegetation to be seen except along the river beds in springtime.

Most of the rivers that rise on the eastern side of the coast range flow through the fertile mountain valleys, break through the eastern mountains, and find their way to the Atlantic. Therefore the valleys of the Andes and the eastern plains are well watered.

The rivers have brought down great quantities of sediment from the mountains and deposited it on the plains, and consequently the plains are very fertile. The northern plain, especially along the great river Amazon, is covered with a thick forest of tropical trees; but the plain of Argentina is almost treeless.

When the Spanish conquerors reached South America the country was inhabited by people whom they called Indians, and the name of Indian has clung to them to this day. In the northern islands and on the northern coast, the adventurers found the fierce and cruel Caribs, and the gentle Arawaks, whom the Caribs hated. In the highlands of Brazil the Portuguese found the Tupayas, whom the other Indians called the "Ancient Ones," while south of the Amazon, the great plains as far as the river Paraguay were inhabited by the Tupis.

In the country that is now Paraguay and Argentina were found a people who called themselves Guaranis. Some people say these were part of the Tupi race, while others say they were a separate people. Farther south, toward the southern end of the continent, were the Patagonians, a very tall people who called themselves the Tehuelches, and in the archipelago of Tierra del Fuego lived a people who were even more primitive than all the others. These races were divided into many tribes, whose names we shall not ask you even to try to remember.

Of all the peoples of whom we have been speaking, the most civilized were the Arawaks. They cultivated corn, and knew how to press the poisonous juices out of the root of the cassava, or manioc, to produce the substance that we know as tapioca, from which they made bread. They were good fishermen, and knew how to make canoes and to use them skillfully; but there their civilization stopped. They had no need of warm clothing or of walled houses to keep out the cold, and they had not learned to weave or to build anything except rough shelters.

The Tupayas never learned to cultivate the ground, and neither did the Patagonians; but the Patagonians, who lived in a cold climate, clothed themselves in the skins of the animals which they killed for food. All these people used bows and arrows in the chase, and weapons and implements made of stone.

It is interesting to know something about their lives, for the Stone Age still continued to exist for them, and they show us how our own savage forefathers lived long ago. Besides, many of their descendants continue to live in much the same way. As you may see from the map, much of the country lies within the tropics. Life there is so easy that people have never had to learn to think, and consequently they have never become anything but grown-up children.

The people who lived in the mountain regions of the west also used stone weapons, but they had reached a much higher stage of civilization, and the stories of the Araucanians, the Chibchas and the Empire of Peru read like a strange romance.

THE ARAUCANIANS, WHOM THE SPANIARDS COULD NOT SUBDUE

Down in the southern part of the continent, where the Andes divide into two ranges, the Araucanians lived in the long central plain between the mountains. They knew something of agriculture, but supported themselves chiefly by hunting, and they are now almost a nomadic people. Nevertheless, when the Spaniards first met them they already had a settled form of government by chiefs and princes. Their territory was divided into four independent sections, which for the sake of convenience we may call principalities, the chiefs of which were called *toques*. Each of the principalities was divided into five provinces, and each province was again subdivided into nine districts. The chieftainship of all these divisions was hereditary, each chief being succeeded by his eldest son. It is said that assemblies of the chiefs were held every year, and that the decisions which they made were submitted to the people of the tribes for approval.

Up in the north of the continent, where the Andes break into a number of ranges, the Chibchas had already learned how to weave, how to build houses and how to till the ground. They cultivated corn and potatoes, and watered their fields by a good system of irrigation. The territory in which they lived was divided into five states, which were governed by chiefs called *caciques*. The people worshiped the sun and the moon, and, as they believed that the *caciques* were descended from the sun, they paid them great honor. They believed in other gods also, and thought that these gods were pleased

SOME NATIONS OF SOUTH AMERICA

Indians in La Paz, Bolivia.

An Aymera Indian of Bolivia.

Indian mother and child in La Paz.

An Inca woman, Peru.

Two Inca lads, Cuzco.

Inca water-carrier with barrel.

An old Inca poses for his portrait.

Indians of Brazil at home.

An Indian of Brazil enjoys a smoke.

Photo of Inca water-carrier by E. M. Newman, from Publishers Photo Service.

with human sacrifices. The lakes, they thought, were the abodes of the gods, and offerings of gold and jewels were thrown into them or buried on the shore.

How the Empire of the Incas Began

The cool, well-watered valleys of Peru were the home of a civilization that has been the wonder of the world since it was first brought to the attention of Europeans by the Spaniards. Its history may have gone back many hundreds of years, but all we know with certainty is told in traditions handed down from a few centuries before Spanish times.

Perhaps a little later than the Norman Conquest of England these valleys were conquered by a neighboring people, who settled there, formed a confederacy of tribes under a prince called the Inca, and built the city of Cuzco. They lived in peace for some centuries. Then some southern tribes, called the Chancas, looked on the valleys with envious eyes and advanced to conquer them. The Inca, who was aged, ran away, followed by most of his people. But his young son Cusi, aided by two aged generals and a few of the chiefs, gathered together a small force of seven hundred men. By skillful use of his little army Cusi contrived to throw the enemy into confusion. When they saw what he had done, other chiefs who were watching from the hills came to his aid, and the Chanca chiefs were utterly routed. Then followed a war in which the Chanca tribes were conquered and their land was added to the Inca's territories. Cusi was made Inca, with the name of Pachacuti.

Conquest usually leads to conquest. Pachacuti and his successors subdued tribe after tribe, until at the time of the Spanish discovery the Empire of Peru stretched from the land of the Chibchas in the north to the land of the Araucanians in the south. Its western boundary was the Pacific Ocean, and on the east it extended in some places down to the forests on the great eastern plain.

This empire had one of the most remarkable governments that the world has ever seen. All the conquered people belonged to the same race and had the same ideas, the same habits of thought and ways of life. Their various dialects were derived from the same language, and most of them had traditions which pointed back to the same ancestors. The Inca Pachacuti, who was the greatest man ever produced by the native American people, worked upon these materials with the skill of a great statesman, and his example was followed by the men who came after him.

No attempt was made to overthrow the customs of the conquered tribes, and the empire was built up on the idea of the village community. No one owned any property: everything belonged to the state. Marriages were arranged by the officers of the state, as were the housing, food and clothing, the games, festivals and work of the people. Men and women of sixty had no work to do; those from fifty to sixty did only a little light work. Most of the labor was performed by men and women between the ages of twenty-five and fifty. Youths worked in the field picking coca, and children did light work at harvest time.

The people were arranged in communities of a hundred families, called *pachecas*. Over each *pacheca* was an officer called a *llacta-camayoc,* and ten *pachecas* formed a *huaranaca,* governed by a chief chosen from the *llacta-camayocs*. Each valley comprised a district called a *hunu,* presided over by a *curaca,* or judge. Over all an imperial officer and staff watched every detail of the administration. Inspectors from the capital examined and reported upon the state of affairs in each district, arranged the marriages, and selected those worthy of helping in the government.

From one point of view the system was the most nearly perfect form of government realized on earth. Nobody in the empire was poor or idle. The noble class had the hardest training, and was exposed to the greatest danger; the laboring class was better off than millions of persons are in our own country.

Everything in the empire was splendidly organized. For instance, the Peruvian Indians were very fond of plays, and the state encouraged scholars to write fine dramas for the people. One of these, composed in the fifteenth century, has come down to us in the Inca language. It is a beautiful, vivid and exciting play, equal to anything that had appeared in modern Europe at the time it was composed. These Indians had made some progress in science and engineering. They knew how many days made up a year; they knew how to divide the days into months, and could tell the time of the equinoxes

with accuracy. They could build roads and bridges, and knew the principle of suspension bridges. They had a truly wonderful system of irrigation. Steep mountains were terraced high up their sides, and with the aid of water from irrigation channels were brought to a high state of cultivation. The people were good agriculturists, and cultivated corn, potatoes, tomatoes, coca and cacao—our cocoa—besides other plants that are not familiar to us.

The Incas Never Learned to Write

No South American people ever invented an alphabet, and although the Peruvians had a well-developed language, and were able to use it in composing plays and songs and poems, they had no means of writing them down. Their only mode of making records of any kind was an elaborate system of knotted cords, called *quipus*, but these were only an aid to memory and had to be translated by learned men, called *auipucamayos*. Still, all things considered, the men of the Inca empire ranked high in intellect.

Until quite lately it was thought that it was the Incas and the tribes to which they belonged who had created the great civilization of the empire. Students now see, however, that this is not so. We know that the beginning of the empire dated back only a few hundred years before the Spanish conquest, and engineers say that it must have taken thousands of years to build up the system of irrigation that exists through the mountain region and along hundreds of miles of the dry coast region. It is said also that it must have taken many hundreds of years to domesticate the llama, which the Peruvians used as a beast of burden. This was the only domestic animal in South America when the Indians went there. The great work that the Incas had done was to organize into an empire the people that they conquered. They succeeded in what they attempted, but in their success the seed of failure was planted. They did not recognize that if a state is to remain great, its people must have liberty and freedom, and must have the right, and feel the need, to struggle for themselves and for all they hold dear. Everything was done for the people. For generations they had been taught to look to the state to supply all their needs. Consequently, when their leaders were taken they were like sheep without a shepherd. The civilization which the Spaniards sought to impose on them was foreign to their minds, and in the centuries since the conquest they have sunk into poverty and fallen into a state almost of barbarism.

Discovery of the Incas by the Spanish, and Their Conquest

The continent was first visited by Europeans in 1498, when Columbus upon his third voyage touched at the mouth of the Orinoco. Other navigators followed. In 1513 Balboa discovered the Pacific Ocean in the Gulf of Panama, and in 1520 Magellan passed through the Straits and around the Pacific Ocean.

Soon after they had settled themselves on the western coast of Panama the Spaniards began to hear rumors of an empire to the south, where great stores of gold were to be found. Francisco Pizarro, one of the adventurers who had come out from Spain, believed these tales, and with the help of two friends, Diego del Almagro and a priest named Hernando de Luques, decided to go and search for the "land of gold." Pizarro and Almagro had very little money, but De Luques had a small fortune, which he lent to his friends. He also used his influence to obtain help for them from the home government.

In the year 1524 Pizarro set out to find the land of gold, but it was three years before, after many tribulations, he reached the Gulf of Guayaquil. There he made friends with the natives, and the stories which they told him and the gold that he saw made him decide to return to Spain and get full powers of conquest from the government. This he did. He himself was appointed governor of any new countries that he might conquer; Almagro was made commandant; and De Luques was appointed bishop of the new province that was to be added to the Spanish possessions.

Pizarro came back to the New World with his new commission in his pocket, and presently he and his two friends set out with about two hundred men to conquer an empire. At Tumbez, on the Gulf of Guayaquil, they heard that Huascar and Atahuallpa, sons of the Inca who had just died, were at war with each other for the empire. Pizarro determined to take advantage of the divisions in the country, and with 168 men he set out to

look for Atahuallpa. The little band of soldiers climbed through the mountains to the town of Cajamarca. The Inca came to meet them with a large number of unarmed followers. The Spaniards attacked, and the Inca was made prisoner. The Spaniards demanded a great sum for the Inca's release, but after part of it was paid Pizarro had him tried for pretended treason and put to death. After that Pizarro made himself master of most of the western country, defeated a Peruvian army at the sacred city of Cuzco and made it a Spanish colony.

Almagro conquered the provinces round about Lake Titicaca, but when he attacked the Araucanians to the south, he found he had to deal with an enemy far stronger than he had hitherto met. He was unable to conquer these fierce tribes, whom the Incas before him had been unable to subdue. The Spaniards tried for two hundred years to bring the Araucanians into subjection, but failed, and finally had to recognize them as independent tribes. It was only in the last century that they were brought under the rule of Chile.

Shortly after the conquest of Peru by Pizarro an adventurer named Quesada advanced up the Magdalena from the north, conquered the Chibchas, slew the princes and enslaved the people. Their civilization was lost, and it is only recently that we have learned that they were almost as far advanced as the people of the Empire of Peru.

Colonization by Spain and Portugal in North and East

The wild tribes of the north could make no stand against the trained soldiers of Spain, and fortified places were established along the coast of Venezuela without opposition.

In the east of the continent the Portuguese established their claim to the coast from the Orinoco to the Rio de la Plata. The history of their settlements belongs to the history of Brazil. The story of that country is on page 7042.

Buenos Aires was first founded in 1535 by Pedro de Mendoza, who had a commission from the king to establish colonies in the south. Mendoza himself sailed for Spain only to die on the voyage home. His followers found it impossible to hold the fort against the hostile Indians, so they sailed farther up the river and founded Asuncion, but later on Buenos Aires was again established.

Laws made to protect the Indians

The Indians were never definitely enslaved, and, in fact, humane laws were made for their treatment. But the governors, soldiers and colonists were far away from Spain. They desired to have laborers to work in the mines, to build the cities and to cultivate the farms. The Indians were forced to work, too often under the lash, in the mines and on the estates. Numbers of them were practically reduced to slavery, and gradually the Inca civilization was forgotten.

The clergy pitied the Indians and sought to shield them from hardship. Every effort was made to teach Christianity to them, and in time most of the old Peruvian people became Christians. The fierce Araucanians, however, refused to have missionaries, and most of the tribes of the eastern plains and forests could not be reached. This was not the fault of the missionaries, and the Jesuits in particular did all that men could do to teach these wild tribes.

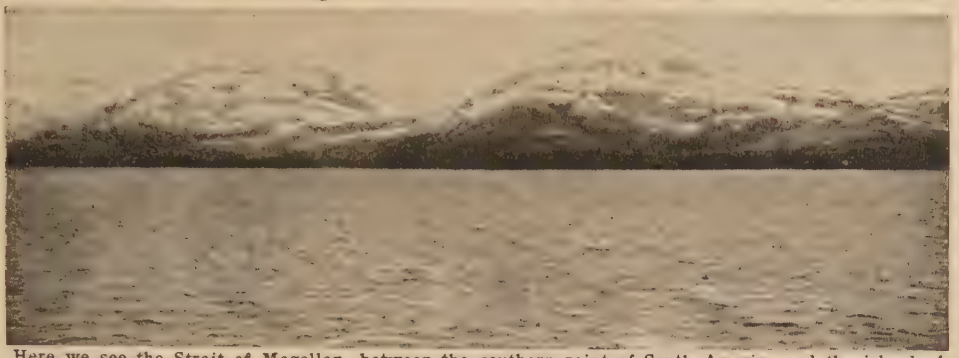
The most famous Jesuit mission was in the province which is now the republic of Paraguay, where they gathered large numbers of the Guarani Indians into village communities. For these villages the Jesuits adopted a form of government something like that established by the Incas. The villagers were taught to sow and reap. They were taught Christianity, cleanliness and industry. There were large schools for the children, and the youths were trained as soldiers, so that they might defend themselves against slave-traders from Brazil. But they were treated as children. No effort was made to teach them to be self-dependent, and when the Jesuits were expelled in 1768 most of the Guaranis wandered away.

Colonial Government by Spain

One of the hard-and-fast rules laid down for the government of the Spanish American colonies was that no one who was not a Spaniard should be permitted to trade with the colonies, and that the colonies should not send their exports direct to any foreign country. For over fifty years the Government was able to keep foreigners away.

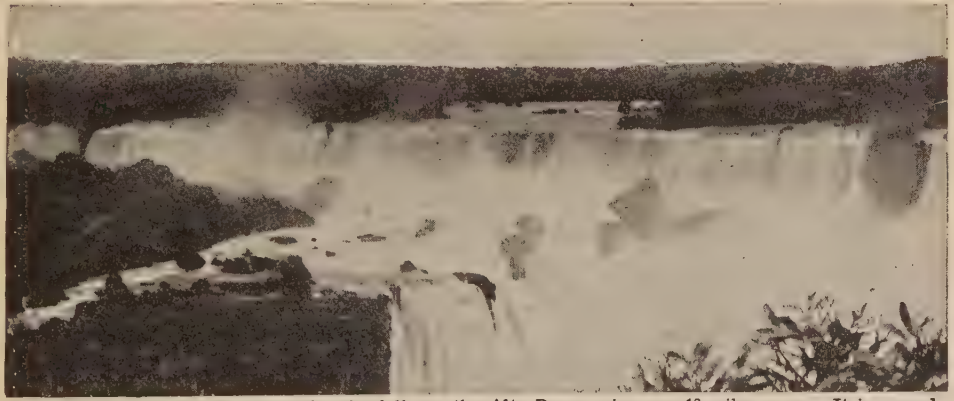
Then the spirit of enterprise awoke in England, and the great adventurers Hawkins and Drake began their raids on the Spanish Islands and the Spanish Main,

NATURE'S MAJESTY IN THE NEW WORLD



Here we see the Strait of Magellan, between the southern point of South America and the island of Tierra del Fuego, discovered by Magellan in 1520, on the first voyage ever made round the world.

The Amazon is the greatest river in the world, and its name is from a native word meaning "boat-destroyer." It is more than 3,000 miles long and 50 miles wide at its mouth, and its fresh water rushes out 200 miles into the sea. Here we see the mighty river as a tiny stream away up in the Andes.



Porto Aguirre, the landing-point for the falls on the Alto Parana, is some 12 miles away. It is named, as is the beautiful Avenida cut through the tropical forest to make them accessible, after Señorita Victoria Aguirre, who defrayed a part of its cost. The Iguazu River flows from Curityba (Brazil) into the Parana, fed by over 30 tributaries. Just before reaching the Argentine frontier it broadens out into a river 2½ miles wide and, dividing into several streams, plunges in various falls over precipices, making cataracts 1,100 yards wide in the Argentine and 1,650 yards in Brazil.

as the northern mainland was then called. Their example was followed by French and Dutch adventurers, and there was an immense amount of smuggling done, of which the colonists were glad to take advantage, for the restrictions of trade fell hard upon them.

Not only were the colonies forbidden to trade with any foreign country, but all the trade with Spain had to go through the port of Seville, and the colonies were not allowed to trade with one another. Once a year fleets of ships gathered at Seville and Cadiz, were laden with goods for the colonies, and sailed under convoy to the west. All the goods for the west and south were carried across the Isthmus of Panama on the backs of mules or Indians, and were shipped again on the other side for the towns on the Pacific coast. For the return voyage the ships gathered at Havana and sailed for Seville, laden with the produce of the northern provinces, while the well-armed galleons carried the gold and silver and precious stones. During the time of Queen Elizabeth the fleet was lucky if it escaped the loss of the treasure-ships; and after James I made peace with Spain the buccaneers, of whom we read on page 4959, made themselves a terror on the high seas.

For over two hundred years all of Spanish South America except Venezuela was ruled from Lima, the capital of Peru, where the viceroy, or king's representative, lived. There were no assemblies, for Spain was an absolute monarchy, and the colonies were looked upon as the king's domains. The laws for the colonies were made by the king, with the assistance of the Council for the Indies. The country was divided into provinces and districts presided over by governors and magistrates, who endeavored to carry out the king's law. Questions in dispute had to be referred to Lima, and we can imagine the vexatious delays that occurred when letters and reports had to be sent from Buenos Aires or Asuncion and carried over the mountains. In 1739, however, the northwestern part of Peru was made into a viceroyalty called New Granada, and in 1776 another viceroy was appointed for the provinces from Bolivia eastward to the Atlantic.

No native-born American, even though he was of pure Spanish descent, could hope to gain high office, for the governor and high officials in both the state and the army were sent from Spain. These officials looked down on the Creoles, or Americans of Spanish descent, and the pride of the Creoles found it hard to bear their disdain. Education, of course, was in the hands of the Church. There were schools for boys and girls and colleges for the young men; and often the children of wealthy parents were sent to Europe for education. On the whole, however, the Government thought it better that the people should not learn much and education was discouraged.

THE WAR OF INDEPENDENCE, AND ITS CAUSE

There was a good deal of dissatisfaction in the colonies over the restrictions in trade and education, the lack of self-government, and what often amounted to tyranny by the governors. After the Revolution in North America the unrest became stronger, and it grew during the years of the Napoleonic Wars in Europe, when there was little communication between the two continents.

The feeling of unrest became greater when Napoleon declared his own brother king of Spain in place of Ferdinand VII, whom he deposed. Little revolts against the Spanish officials began to break out all over the country, and in 1810 they flamed into rebellion. In May, 1810, Argentina revolted. July of the same year saw Venezuela in rebellion. New Granada had already declared itself a republic, and Chile soon joined. Years of warfare followed, but in the end the colonists were victorious, and the great Spanish dominion broke up.

The great leaders in the war of independence were Simon Bolivar in Venezuela, José de San Martin in Argentina, and Bernardo O'Higgins in Chile. Bolivar, who is called "The Liberator," freed Venezuela, Colombia and Ecuador from Spanish dominion. O'Higgins was instrumental chiefly in winning the independence of Chile, while San Martin not only defeated the Spanish armies in Argentina, but brought an army to Peru and defeated them there. Spanish rule lasted longer in Peru than elsewhere; but finally Bolivar, who had been made president of Colombia, led an army into the north. In December, 1894, the viceroy was taken prisoner by General Sucre, one of Bolivar's generals, and the three centuries of Spanish rule were over.

THE NEXT STORY OF ALL COUNTRIES IS ON PAGE 6975.

BEAUTIFUL INDIAN CARVING AND STONE WORK

Typical doorway of Spanish Conquistadoras in Cuzco, Peru.

A street in Cuzco, Peru, showing the marvelous stonework of the Inca Indians.

An Indian market in Cuzco, Peru, is a marvelously picturesque sight and a veritable feast of color. Framed by mountain horizons and warm stonework, the square resembles a bed of gorgeous flowers. The hats and blankets are of native manufacture. © E. M. Newman, from Publishers Photo Service.

FRENCH—THE MAN WHO DISAPPEARED

First line, French; second line, English word; third line, as we say it in English.

Ceci est l'histoire d'un arbre de Noël, et d'un petit garçon qui s'appelle Henri.
This is the history of a tree of Christmas, and of a little boy who himself calls Henry.
This is the story of a Christmas tree and a boy named Henry.

Il avait beaucoup neigé, et la terre était toute blanche.
It had much snowed, and the earth was all white.
It had been snowing hard, and the ground was white.

Henri et ses amis firent des boules de neige. Ils firent une bataille.
Henry and his friends made some balls of snow. They made a battle.
Henry and his friends made snowballs. They had a battle.

Dans la salle d'école il y avait un arbre de Noël décoré de cadeaux.
In the room of school there was a tree of Christmas decorated of presents.
In the schoolroom there was a Christmas tree hung with presents.

L'après-midi les enfants firent un bonhomme de neige dans le jardin.
The after midday the children made a goodman of snow in the garden.
In the afternoon the children made a snow man in the garden.

"Je ferai un bonhomme de neige pour l'arbre," pensa Henri en lui-même.
"I will make a goodman of snow for the tree," thought Henry in himself.
"I will make a snow man for the tree," thought Henry to himself.

Il fit le corps, les bras, les jambes, et mit une pipe dans la bouche.
He made the body, the arms, the legs, and put a pipe in the mouth.
He made the body, the arms and the legs, and put a pipe in his mouth.

Il plaça l'effigie sur le couvercle d'une boîte, et pendit la boîte à l'arbre.
He placed the effigy upon the cover of a box, and hung the box to the tree.
He put the figure on the cover of a box, and hung it on the tree.

Le lendemain matin il courut à l'arbre, et que pensez-vous qu'il trouva?
The next morning he ran to the tree, and what think you that he found?
In the morning he ran to the tree, and what do you think he found?

Une petite mare d'eau! Naturellement la neige avait fondu pendant la nuit.
A little pool of water! Naturally the snow had melted during the night.
A little pool of water! Of course the snow had melted in the night.

THE NEXT FRENCH STORY IS ON PAGE 6954.

A FAMOUS POEM BY ROBERT BROWNING

IN the extremely spirited poem entitled How They Brought the Good News from Ghent to Aix, the detail of which is so accurate, the whole picture so vivid, that we might easily imagine it to be the description of an actual episode in history, we see how the poet's imagination can create a living picture without the help of facts. For Robert Browning, in writing the poem, had no historical episode in mind, and really sought, by the art of verse, to suggest the rhythmic movement of a fine horse at a gallop. This he does to perfection, and even in this respect the poem is an effort of pure imagination, as the poet wrote it on a boat off the coast of Africa.

HOW THEY BROUGHT THE GOOD NEWS

CONTINUED FROM 6801

I SPRANG to the stirrup, and Joris, and he;
I galloped, Dirck galloped, we galloped all three.
"Good speed!" cried the watch as the gate-bolts undrew;
"Speed!" echoed the wall to us galloping through.
Behind shut the postern, the lights sank to rest,
And into the midnight we galloped abreast.

Not a word to each other; we kept the great pace
Neck by neck, stride by stride, never changing our place;
I turned in my saddle and made its girths tight,
Then shortened each stirrup, and set the pique right,
Rebuckled the cheek-strap, chained slacker the bit,
Nor galloped less steadily Roland a whit.

'Twas moonset at starting; but, while we drew near
Lokeren, the cocks crew and twilight dawned clear.
At Boom a great yellow star came out to see;
At Düffeld, 'twas morning as plain as could be.
And from Mecheln church-steeple we heard the half-chime,
So Joris broke silence with: "Yet there is time!"

At Aerschot, up leaped of a sudden the sun,
And against him the cattle stood black every one,
To stare through the mist at us galloping past;
And I saw my stout galloper, Roland, at last,
With resolute shoulders each butting away
The haze, as some bluff river headland its spray.

And his low head and crest, just one sharp ear bent back
For my voice, and the other pricked out on his track;
And one eye's black intelligence—ever that glance
O'er its white edge at me, his own master, askance!
And the thick, heavy spume-flakes which aye and anon
His fierce lips shook upwards in galloping on.

By Hasselt, Dirck groaned; and cried Joris, "Stay spur!
Your Roos galloped bravely, the fault's not in her,
We'll remember at Aix"—for one heard the quick wheeze
Of her chest, saw the stretched neck, and staggering knees,
And sunk tail, and horrible heave of the flank,
As down on her haunches she shuddered and sank.

So we were left galloping, Joris and I,
Past Loos and past Tongres, no cloud in the sky.
The broad sun above laughed a pitiless laugh,
'Neath our foot broke the brittle, bright stubble like chaff;
Till over by Dalhem a dome-tower sprang white,
And "Gallop," cried Joris, "for Aix is in sight!"

"How they'll greet us!" and all in a moment his roan
Rolled neck and croup over, lay dead as a stone;
And there was my Roland to bear the whole weight
Of the news which alone could save Aix from her fate,
With his nostrils like pits full of blood to the brim,
And with circles of red for his eye-sockets' rim.

Then I cast my loose buff-coat, each holster let fall,
Shook off both my jack-boots, let go belt and all,

Stood up in the stirrup, leaned, patted his ear,
Called my Roland his pet name, my horse without peer;
Clapped my hands, laughed and sang, any noise, bad or good,
Till at length into Aix Roland galloped and stood.

And all I remember is friends flocking round
As I sat with his head 'twixt my knees on the ground,
And no voice but was praising this Roland of mine,
As I poured down his throat our last measure of wine,
Which (the burgesses voted by common consent)
Was no more than his due who brought good news from Ghent.

SHERIDAN'S RIDE

This stirring poem by T. Buchanan Read, which describes an incident in the Civil War, takes us off our feet by its swing and gallop, and is a great favorite with many school children.

UP from the South at break of day,
Bringing to Winchester fresh dismay,
The affrighted air with a shudder bore,
Like a herald in haste, to the chieftain's door,
The terrible grumble, and rumble, and roar,
Telling the battle was on once more—
And Sheridan twenty miles away.

And wider still those billows of war
Thundered along the horizon's bar;
And louder yet into Winchester rolled
The roar of that red sea uncontrolled,
Making the blood of the listener cold,
As he thought of the stake in that fiery fray—
And Sheridan twenty miles away.

But there is a road from Winchester town,
A good, broad highway leading down;
And there, through the flush of the morning light,
A steed as black as the steeds of night
Was seen to pass as with eagle flight;
As if he knew the terrible need,
He stretched away with his utmost speed;
Hills rose and fell; but his heart was gay,
With Sheridan fifteen miles away.

Still spring from those swift hoofs, thundering South,
The dust, like smoke from the cannon's mouth,
Or the trail of a comet, sweeping faster and faster,
Foreboding to traitors the doom of disaster.
The heart of the steed and the heart of the master,
Were beating like prisoners assaulting their walls,
Impatient to be where the battlefield calls;
Every nerve of the charger was strained to full play,
With Sheridan only ten miles away.

Under his spurning feet the road,
Like an arrowy Alpine river flowed,
And the landscape sped away behind
Like an ocean flying before the wind,
And the steed, like a bark fed with furnace fire,
Swept on, with his wild eye full of fire.
But lo! he is nearing his heart's desire:
He is snuffing the smoke of the roaring fray,
With Sheridan only five miles away.

The first that the general saw were the groups
Of stragglers, and then the retreating troops.
What was done—what to do? A glance told him both.
Then, striking his spurs, with a terrible oath
He dashed down the line, 'mid a storm of huzzas,
And the wave of retreat checked its course there, because
The sight of the master compelled it to pause.
With foam and with dust the black charger was gray;
By the flash of his eye, and the red nostrils' play,
He seemed to the whole great army to say:
"I have brought you Sheridan all the way
From Winchester town to save the day."

Hurrah! hurrah for Sheridan!
Hurrah! hurrah for horse and man!
And when their statues are placed on high,
Under the dome of the Union sky,
The American soldiers' Temple of Fame,
There, with the glorious general's name,
Be it said, in letters both bold and bright:
"Here is the steed that saved the day,
By carrying Sheridan into the fight,
From Winchester, twenty miles away!"

THE DEATH OF NAPOLEON

WILD was the night, yet a wilder night
Hung around the soldier's pillow;
In his bosom there waged a fiercer fight
Than the fight on the wrathful billow.

A few fond mourners were kneeling by,
The few that his stern heart cherished;
They knew, by his glazed and unearthly eye,
That life had nearly perished.

They knew by his awful and kingly look,
By the order hastily spoken,
That he dreamed of days when the nations shook,
And the nations' hosts were broken.

He dreamed that the Frenchman's sword still slew,
And triumphed the Frenchman's eagle,
And the struggling Austrian fled anew
Like the hare before the beagle.

The bearded Russian he scourged again,
The Prussian's camp was routed,
And again on the hills of haughty Spain
His mighty armies shouted.

Over Egypt's sands, over Alpine snows,
At the pyramids, at the mountain,
Where the wave of the lordly Danube flows,
And by the Italian fountain,

On the snowy cliffs where mountain streams
Dash by the Switzer's dwelling,
He led again, in his dying dreams,
His hosts, the broad earth quelling.

Again Marengo's field was won,
And Jena's bloody battle;
Again the world was overrun,
Made pale at his cannon's rattle.

He died at the close of that darksome day,
A day that shall live in story;
In the rocky land they placed his clay,
"And left him alone with his glory."

—ISAAC MCLELLAN.

THE BELL OF ATRI

Longfellow is pre-eminent in his gift of narrative poetry, or the art of telling again in tuneful verse some old, old story. Here he gives us, with admirable art and sympathy, an old legend of an Italian town. The story is told so simply that scarcely any detail requires explanation, but it will help the young readers to know that *Giovanni* is the Italian for "John," and *Re* for "king."

AT Atri, in Abruzzo, a small town
Of ancient Roman date, but scant renown,
One of those little places that have run
Half up the hill, beneath a blazing sun,
And then sat down to rest, as if to say,
"I climb no farther upward, come what may,"
The Re Giovanni, now unknown to fame,
So many monarchs since have borne the name,
Had a great bell hung in the market-place
Beneath a roof, projecting some small space,
By way of shelter from the sun and rain.
Then rode he through the streets with all his train,
And, with a blast of trumpets loud and long,
Made proclamation, that whenever wrong
Was done to any man, he should but ring
The great bell in the square, and he, the King,
Would cause the Syndic to decide thereon.
Such was the proclamation of King John.

How swift the happy days in Atri sped,
What wrongs were righted need not here be said.
Suffice it that, as all things must decay,
The hempen rope at length was worn away,
Unraveled at the end, and, strand by strand,
Loosened and wasted in the ringer's hand,
Till one, who noted this in passing by,
Mended the rope with braids of briony,
So that the leaves and tendrils of the vine
Hung like a votive garland at a shrine.

By chance it happened that in Atri dwelt
A knight, with spur on heel and sword in belt,
Who loved to hunt the wild boar in the woods,
Who loved his falcons with their crimson hoods,

Who loved his hounds and horses, and all sports,
And prodigalities of camps and courts;
Loved, or had loved them; for at last, grown old,
His only passion was the love of gold.

He sold his horses, sold his hawks and hounds,
Rented his vineyards and his garden grounds,
Kept on one steed, his favorite steed of all,
To starve and shiver in a naked stall,
And day by day sat brooding in his chair,
Devising plans how best to hoard and spare.

At length he said: "What is the use or need
To keep at my own cost this lazy steed,
Eating his head off in my stables here,
When rents are low and provender is dear?
Let him go feed upon the public ways;
I want him only for the holidays."
So the old steed was turned into the heat
Of the long, lonely, silent, shadeless street;
And wandered in suburban lanes forlorn,
Barked at by dogs, and torn by briar and thorn.

One afternoon, as in that sultry clime
It is the custom in the summer-time,
With the bolted doors and window-shutters closed,
The inhabitants of Atri slept or dozed;

When suddenly upon their senses fell
The loud alarum of the accusing bell!
The Syndic started from his deep repose,
Turned on his couch, and listened, and then rose
And donned his robes, and with reluctant pace
Went panting forth into the market-place,
Where the great bell upon its crossbeam swung,
Reiterating with persistent tongue,
In half-articulate jargon, the old song:
"Someone hath done a wrong, hath done a wrong!"

But ere he reached the belfry's light arcade
He saw, he thought, beneath its shade,
No shape of human form of woman born,
But a poor steed, dejected and forlorn,
Who, with uplifted head and eager eye,
Was tugging at the vines of briony.
"Domeneddio!" cried the Syndic straight,
"This is the Knight of Atri's steed of state!
He calls for justice, being sore distressed,
And pleads his cause as loudly as the best."

Meanwhile from street and lane a noisy crowd
Had rolled together like a summer cloud,
And told the story of the wretched beast
In five-and-twenty different ways at least,
With much gesticulation and appeal
To heathen gods, in their excessive zeal.

The knight was called and questioned; in reply
Did not confess the fact, did not deny;
Treated the matter as a pleasant jest,
And set at naught the Syndic and the rest,
Maintaining, in an angry undertone,
That he should do what pleased him with his own.

And thereupon the Syndic gravely read
The proclamation of the King; then said:
"Pride goeth forth on horseback grand and gay,
But cometh back on foot, and begs its way;
Fame is the fragrance of heroic deeds,
Of flowers of chivalry and not of weeds!
These are familiar proverbs, but I fear
They never yet have reached your knightly ear.
What fair renown, what honor, what repute
Can come to you from starving this poor brute?
He who serves well and speaks not, merits more
Than they who clamor loudest at the door.
Therefore the law decrees that as this steed
Served you in youth, henceforth you shall take heed
To comfort his old age, and to provide
Shelter in stall, and food and field beside."

The knight withdrew, abashed; the people all
Led home the steed in triumph to his stall.
The King heard and approved, and laughed in glee,
And cried aloud: "Right well it pleaseth me!
Church-bells at best but ring us to the door,
But go not in to Mass; my bell doth more:
It cometh into court and pleads the cause
Of creatures dumb, and unknown to the laws;
And this shall make, in every Christian clime,
The bell of Atri famous for all time."

THE MILLER OF THE DEE

Charles Mackay's songs always breathe a genial spirit, and this is one of the heartiest. The joy of inward health and gay content is caroled so naturally by the happy miller that he is envied by a passing king. Notice how well a story may be told in easy words. Out of 201 words in these verses 177 are of one syllable, and only one—"nobody"—has three.

THERE dwelt a miller hale and bold
Beside the River Dee;
He wrought and sang from morn to night,
No lark more blithe than he;
And this the burden of his song
For ever used to be—
"I envy nobody, no, not I,
And nobody envies me!"

"Thou'rt wrong, my friend!" said old King Hal,
"Thou'rt wrong as wrong can be;
For could my heart be light as thine
I'd gladly change with thee.
And tell me now what makes thee sing
With voice so loud and free,
While I am sad, though I'm the king,
Beside the River Dee?"

The miller smiled and doffed his cap:
"I earn my bread," quoth he;
"I love my wife, I love my friends,
I love my children three;
I owe no penny I cannot pay;
I thank the River Dee,
That turns the mill and grinds the corn,
To feed my babes and me."

"Good friend!" said Hal, and sighed the while,
"Farewell, and happy be;
But say no more, if thou'dst be true,
That no one envies thee.
Thy mealy cap is worth my crown,
Thy mill my kingdom's fee!
Such men as thou are England's boast,
O miller of the Dee!"

I SAW A NEW WORLD

In this poem W. B. Rands shows what a mess might be made of the world if it were to be fixed without change, and how interesting it is with all its surprises and strife and hope and dreams.

I SAW a new world in my dream,
Where all the folks alike did seem;
There was no Child, there was no Mother,
There was no Change, there was no Other.

For everything was Same, the Same;
There was no Praise, there was no Blame;
There was neither Need nor Help for it;
There was nothing fitting, or unfit.

Nobody laughed, nobody wept;
None grew weary, so none slept;
There was nobody born, and nobody wed;
This world was a world of the living dead.

I longed to hear the Time-Clock strike
In the world where the people were all alike;
I hated Same, I hated Forever,
I longed to say Neither, or even Never.

I longed to mend, I longed to make,
I longed to give, I longed to take,
I longed for a change, whatever came after,
I longed for crying, I longed for laughter.

THE SEA

The spirit of freedom which one seems to absorb when voyaging over the sparkling sea has never been better rendered than in this poem by Barry Cornwall, whose real name was Procter. In this case it is supposed to be an old sailor who is speaking. The salty breeze, which the poet has so cleverly suggested by the swift movement of his verse, is familiar to us all. There is a certain infectious quality in this song of the sea.

THE sea! the sea! the open sea!
The blue, the fresh, the ever free!
Without a mark, without a bound,
It runneth the earth's wide regions round;
It plays with the clouds; it mocks the skies;
Or like a cradled creature lies.

I'm on the sea! I'm on the sea!
I am where I would ever be;
With the blue above, and the blue below,
And silence wheresoe'er I go;
If a storm should come and awake the deep,
What matter? *I* shall ride and sleep.

I love, O, how I love to ride
On the fierce, foaming, bursting tide,
When every mad wave drowns the moon
Or whistles aloft his tempest tune;
And tells how goeth the world below,
And why the sou'west blasts do blow.

I never was on the dull, tame shore,
But I loved the great sea more and more,
And backwards flew to her billowy breast,
Like a bird that seeketh its mother's nest;
And a mother she was, and is to me;
For I was born on the open sea!

The waves were white, and red the morn,
In the noisy hour when I was born;
And the whale it whistled, the porpoise rolled,
And the dolphins bared their backs of gold;
And never was heard such an outcry wild
As welcomed to life the ocean-child!

I've lived since then, in calm and strife,
Full fifty summers, a sailor's life,
With wealth to spend and a power to range,
But never have sought nor sighed for change;
And Death, whenever he comes to me,
Shall come on the wild unbounded sea!

ALEXANDER SELKIRK

William Cowper, the English poet, endeavors in this poem to suggest thoughts that might have arisen in the mind of Alexander Selkirk as he stood on the highest point of his lonely island and surveyed the scene on which his fate had cast him. Alexander Selkirk was the shipwrecked mariner whose adventures on an island suggested to Daniel Defoe the story of Robinson Crusoe.

I AM monarch of all I survey;
My right there is none to dispute;
From the centre all round to the sea
I am lord of the fowl and the brute.
O Solitude! where are the charms
That sages have seen in thy face?
Better dwell in the midst of alarms
Than reign in this horrible place.

I am out of humanity's reach,
I must finish my journey alone,
Never hear the sweet music of speech;
I start at the sound of my own.
The beasts that roam over the plain
My form with indifference see;
They are so unacquainted with man,
Their tameness is shocking to me.

Society, Friendship, and Love,
Divinely bestowed upon man,
O, had I the wings of a dove
How soon would I taste you again!
My sorrows I then might assuage
In the ways of religion and truth,
Might learn from the wisdom of age,
And be cheered by the sallies of youth.

Religion! what treasure untold
Resides in that heavenly word!
More precious than silver and gold,
Or all that this earth can afford.
But the sound of the church-going bell
These valleys and rocks never heard;
Ne'er sighed at the sound of a knell,
Or smiled when a sabbath appeared.

Ye winds that have made me your sport,
Convey to this desolate shore
Some cordial endearing report
Of a land I shall visit no more:
My friends, do they now and then send
A wish or a thought after me?
O tell me I yet have a friend,
Though a friend I am never to see.

How fleet is the glance of the mind!
Compared with the speed of its flight,
The tempest itself lags behind,
And the swift-winged arrows of light.
When I think of my own native land,
In a moment I seem to be there;
But alas! recollection at hand
Soon hurries me back to despair.

But the sea-fowl is gone to her nest,
The beast is laid down in his lair;
Even here is a season of rest,
And I to my cabin repair.
There's mercy in every place;
And mercy, encouraging thought!
Gives even affliction a grace
And reconciles man to his lot.

ETERNAL FATHER, STRONG TO SAVE

It is often said that many of the hymns used in our churches are deficient in literary quality, though their piety may be unquestioned. That charge cannot be made against the following well-known hymn, written by W. Whiting in 1860.

ETERNAL Father, strong to save,
Whose arm hath bound the restless wave,
Who bidst the mighty ocean deep
Its own appointed limits keep;
O, hear us when we cry to Thee
For those in peril on the sea!

O Christ, whose voice the waters heard,
And hushed their raging at Thy word,
Who walkedst on the foaming deep,
And calm amid the storm didst sleep;
O, hear us when we cry to Thee
For those in peril on the sea!

Most Holy Spirit, who didst brood
Upon the chaos dark and rude,
And bid its angry tumult cease,
And give, for wild confusion, peace;
O, hear us when we cry to Thee
For those in peril on the sea!

O Trinity of love and power,
Our brethren shield in danger's hour
From rock and tempest, fire and foe,
Protect them wheresoe'er they go;
Thus evermore shall rise to Thee
Glad hymns of praise from land and sea.

RECESSIONAL

Rudyard Kipling would rank high among English poets if he had written nothing but this great poem. In 1897 England saw the gorgeous celebration of Queen Victoria's Diamond Jubilee, when representatives came from the remotest parts of the British Empire to take part in the triumphal procession through the streets of London. A great naval review provided an imposing display of her strength upon the seas. Kipling published this poem, Recessional—as the hymn sung when the congregation is leaving church is termed—to remind the English people that all they held was in the hands of God.

GOD of our fathers, known of old—
Lord of our far-flung battle-line—
Beneath whose awful hand we hold
Dominion over palm and pine—
Lord God of Hosts, be with us yet,
Lest we forget—lest we forget!

The tumult and the shouting dies—
The Captains and the Kings depart—
Still stands Thine ancient sacrifice,
An humble and a contrite heart.
Lord God of Hosts, be with us yet,
Lest we forget—lest we forget!

Far-called, our navies melt away—
On dune and headland sinks the fire—
Lo, all our pomp of yesterday
Is one with Nineveh and Tyre!
Judge of the Nations, spare us yet,
Lest we forget—lest we forget!

If, drunk with sight of power, we loose
Wild tongues that have not Thee in awe—
Such boasting as the Gentiles use,
Or lesser breeds without the Law—
Lord God of Hosts, be with us yet,
Lest we forget—lest we forget!

For heathen heart that puts her trust
In reeking tube and iron shard—
All valiant dust that builds on dust,
And guarding calls not Thee to guard,—
For frantic boast and foolish word,
Thy Mercy on Thy People, Lord! *Amen.*

WHILE WE MAY

Some fine poems have been written by anonymous authors. While We May is one of these, and is well worth reading. It is a tender plea for patience with the faults of those we love.

THE hands are such dear hands;
They are so full; they turn at our demands
So often; they reach out
With trifles scarcely thought about
So many times; they do
So many things for me, for you—
If their fond wills mistake,
We may well bend, not break.

They are such fond, frail lips
That speak to us. Pray if love strips
Them of discretion many times,
Or if they speak too slow or quick; such crimes
We may pass by, for we may see
Days not far off when those small words may be
Held not as slow, or quick, or out of place, but dear,
Because the lips are no more here.

They are such dear, familiar feet, that go
Along the path with ours, feet fast or slow,
And trying to keep pace; if they mistake
Or tread upon some flower that we would take
Upon our breast, or bruise some reed,
Or crush poor Hope until it bleed,
We may be mute,
Nor turning quickly to impute
Grave fault; for they and we
Have such a little way to go, can be
Together such a little while along the way,
We will be patient while we may.

So many little faults we find—
We see them—for not blind
Is love. We see them, but if you and I
Perhaps remember them some by and by
They will not be
Faults then, grave faults, to you and me,
But just odd ways, mistakes, or even less—
Remembrances to bless.
Days change so many things—yes, hours;
We see so differently in suns and showers.
Mistaken words to-night
May be so cherished by to-morrow's light,
We may be patient, for we know
There's such a little way to go.

LOVE AND FRIENDSHIP

We can always tell a song written by Thomas Moore, the famous Irish poet, as the melody seems peculiar to his verse.

"A TEMPLE to Friendship," said Laura, enchanted,
"I'll build in this garden,—the thought is divine!"
Her temple was built, and she now only wanted
An image of Friendship to place on the shrine.
She flew to a sculptor, who set down before her
A Friendship, the fairest his heart could invent;
But so cold and so dull, that the youthful adorer
Saw plainly this was not the idol she meant.

"Oh, never," she cried, "could I think of enshrining
An image whose looks are so joyless and dim:—
But yon little god, upon roses reclining,
We'll make, if you please, sir, a Friendship of him."
So the bargain was struck. With the little god laden
She joyfully flew to her shrine in the grove:
"Farewell," said the sculptor, "you're not the first maiden
Who came but for Friendship and took away Love!"

OMISSION

The author of these lines, Margaret E. Sangster, has written stories for young people and several volumes of verse.

IT is not the thing you do, dear,
'Tis the thing you leave undone
Which gives you a bitter heartache
At the setting of the sun.
The tender word forgotten,
The letter you did not write,
The flower you might have sent, dear,
Are your haunting ghosts to-night.

THANKSGIVING DAY

This pretty little poem, which has been set to music, was written by Lydia Maria Child, a noted abolitionist. An *abolitionist* was one who wished to do away with negro slavery.

OVER the river and through the wood,
To grandfather's house we go;
The horse knows the way
To carry the sleigh
Through the white and drifted snow.

Over the river and through the wood—
Oh, how the wind does blow!
It stings the toes
And bites the nose,
As over the ground we go.

Over the river and through the wood,
To have a first-rate play;
Hear the bells ring
"Ting-a-ling-ding!"
Hurrah for Thanksgiving Day!

Over the river and through the wood,
Trot fast, my dapple-gray!
Spring over the ground,
Like a hunting hound!
For this is Thanksgiving Day.

Over the river and through the wood,
And straight through the barn-yard gate,
We seem to go
Extremely slow—
It is so hard to wait!

Over the river and through the wood—
Now grandmother's cap I spy!
Hurrah for the fun!
Is the pudding done?
Hurrah for the pumpkin pie!

A FATHER'S BLESSING

This quaint will of good wishes was made by Richard Corbet, who was somewhat of a poet in the same period as Shakespeare. From being a poor boy he became a bishop, first of Oxford and then of Norwich. An observant reading of the good things that the bishop wished for his children throws a good deal of light on the spirit of his age.

WHAT I shall leave thee none can tell,
But all shall say I wish thee well;
I wish thee, Vin, before all wealth,
Both bodily and ghostly health:
Nor too much wealth nor wit come to thee,
So much of either may undo thee.
I wish thee learning not for show,
Enough for to instruct and know;
Not such as gentlemen require
To prate at table or at fire.
I wish thee all thy mother's graces,
Thy father's fortunes and his places.
I wish thee friends, and one at Court,
Not to build on, but support;
To keep thee not in doing many
Oppressions, but from suffering any.
I wish thee peace in all thy ways,
Nor lazy nor contentious days;
And, when thy soul and body part,
As innocent as now thou art.

BLESSED ARE THEY THAT MOURN

William Cullen Bryant seeks in these verses to give poetic expression to one of the sayings of Jesus, "Blessed are they that mourn, for they shall be comforted." These verses are beautiful, and full of comfort and hope to those that are sad.

OH, deem not they are blest alone
Whose lives a peaceful tenor keep;
The Power who pities man has shown
A blessing for the eyes that weep.

There is a day of sunny rest
For every dark and troubled night;
And grief may bide, an evening guest,
But joy shall come with early light.

For God has marked each sorrowing day,
And numbered every secret tear,
And heaven's long age of bliss shall pay
For all His children suffer here.

O MAMMY'S PICKANINNY

This pretty little poem by Lilla T. Elder will appeal to the little folks, whether of the northern or the southern states.

DEY say dat in de winter in de norf it mostly snows,
Dé skies am black an' dark, an' a-roarin' col' wind blows.
Ef you wuz dar, ma honey, you would freeze dose little toes,
An' you couldn't look about yer widout muffin' up yer nose,
O mammy's pickaninny.

Heah de roses bloom aroun' us an' de yaller jasmine grows,
De gret big sun's a-shinin' as de corn stands in rows—
O, wat's good fer colored poor folks de Lord in heaben knows,
So keep right on, ma honey, kickin' up dose little toes.
O mammy's pickaninny.

TO THE FRINGED GENTIAN

William Cullen Bryant's poem To a Waterfowl and this poem of The Fringed Gentian are almost unexcelled as nature poems.

THOU blossom bright with autumn dew,
And colored with the heaven's own blue,
That openest when the quiet light
Succeeds the keen and frosty night,

Thou comest not when violets lean
O'er wandering brooks and springs unseen,
Or columbines, in purple dressed,
Nod o'er the ground-bird's hidden nest.

Thou waitest late and com'st alone,
When woods are bare and birds are flown,
And frosts and shortening days portend
The aged year is near his end.

Then doth thy sweet and quiet eye
Look through its fringes to the sky,
Blue—blue—as if that sky let fall
A flower from its cerulean wall.

I would that thus, when I shall see
The hour of death draw near to me,
Hope, blossoming within my heart,
May look to heaven as I depart.

THE MAPLE LEAF FOREVER

This is one of the national songs of Canada. It is by Alexander Muir and celebrates the historic days and glorious sites of Canada's early story. The maple leaf is the chosen floral emblem of the great Dominion as the rose is of old England.

IN days of yore, from Britain's shore
Wolfe, the dauntless hero, came,
And planted firm Britannia's flag
On Canada's fair domain.
Here may it wave, our boast, our pride,
And joined in love together,
The Thistle, Shamrock, Rose entwine
The Maple Leaf forever!

The Maple Leaf, our emblem dear,
The Maple Leaf forever!
God save our King and Heaven bless
The Maple Leaf forever!

At Queenston's Heights and Lundy's Lane,
Our brave fathers, side by side,
For freedom, homes, and loved ones dear,
Firmly stood and nobly died;
And those dear rights which they maintained,
We swear to yield them never!
Our watchword evermore shall be,
The Maple Leaf forever!

Our fair Dominion now extends
From Cape Race to Nootka Sound;
May peace forever be our lot,
And plenteous store abound;
And may those ties of love be ours
Which discord cannot sever,
And flourish green o'er Freedom's home,
The Maple Leaf forever!

On Merry England's far-famed land
May kind Heaven sweetly smile;
God bless Old Scotland evermore,
And Ireland's Emerald Isle!
Then swell the song both loud and long,
Till rocks and forests quiver,
God save our King, and Heaven bless
The Maple Leaf forever!

THE ROSE

This pretty little poem was written by Edmund Waller, a poet and genial courtier of the seventeenth century and a great favorite in the court of King Charles II.

GO, lovely rose!
Tell her what wastes her time and me,
That now she knows,
When I resemble her to thee,
How sweet and fair she seems to be.

Tell her that's young
That shuns to have her graces spied,
That hadst thou sprung
In deserts, where no men abide,
Thou must have uncommended died.

Small is the worth
Of beauty from the light retired;
Bid her come forth,
Suffer herself to be desired,
And not blush so to be admired.

Then die! that she
The common fate of all things rare
May read in thee:
How small a part of time they share
That are so wondrous sweet and fair!

ST. AGNES' EVE

St. Agnes' Eve, celebrated on January 20, was, according to an old superstition, the night on which young girls could, by means of magical arts, see the forms of their future husbands. There is an exquisite poem on this subject by John Keats, but it is too long to be included in The Book of Knowledge. We are giving here the beautiful poem by Tennyson, inspired by the history of this saint.

DEEP on the convent-roof the snows
Are sparkling to the moon:
My breath to heaven like vapor goes:
May my soul follow soon!
The shadows of the convent-towers
Slant down the snowy sward,
Still creeping with the creeping hours
That lead me to my Lord:
Make Thou my spirit pure and clear
As are the frosty skies,
Or this first snowdrop of the year
That in my bosom lies.

As these white robes are soiled and dark,
To yonder shining ground;
As this pale taper's earthly spark,
To yonder argent round;
So shows my soul before the Lamb,
My spirit before Thee;
So in mine earthly house I am,
To that I hope to be.
Break up the heavens, O Lord! and far,
Through all yon starlight keen,
Draw me, thy bride, a glittering star,
In raiment white and clean.

He lifts me to the golden doors;
The flashes come and go;
All heaven bursts her floors,
And strows her lights below,
And deepens on and up! the gates
Roll back, and far within
For me the Heavenly Bridegroom waits,
To make me pure of sin.
The Sabbaths of Eternity,
One Sabbath deep and wide—
A light upon the shining sea—
The Bridegroom with his bride!

NEARING THE SNOW-LINE

SLOW toiling upward from the misty vale,
I leave the bright enamelled zones below;
No more for me their beauteous bloom shall glow,
Their lingering sweetness load the morning gale;
Few are the slender flowerets, scentless, pale,
That on their ice-clad stems all trembling blow
Along the margin of unmelting snow;
Yet with unsaddened voice thy verge I hail,
White realm of peace above the flowering line;
Welcome thy frozen domes, thy rocky spires!
O'er thee undimmed the moon-girt planets shine,
On thy majestic altars fade the fires
That filled the air with smoke of vain desires,
And all the unclouded blue of heaven is thine!

—OLIVER WENDELL HOLMES, 1870.

OURSELVES AND THE NATION

CONTINUED FROM 6487

HOWEVER far back we go in the history of thought we find it recognized that man is, as Aristotle called him, a social animal. "None of us liveth to himself, and no man dieth to himself." We are members one of another. No one knows what a solitary human being would be like, for the best of all good reasons, which is, that there could not be a solitary human being. Each of us is part of a great whole.

People used to talk of "man before society," but no one can now believe that there ever was a time when man existed and a state of union between men did not exist; and we are all agreed that Aristotle is right, and that we are social by our very nature. Man has been a social being from the first.

One remarkable result of this, which has, curiously enough, been constantly forgotten, is that no one knows what a single human being unaffected by other human beings would be like. Not only do we not know, but we never can directly know. We are so made that it is quite impossible for a human being to exist at all apart from the influence of other human beings over him. We come into the world helpless, less able to take care of ourselves than any other living thing, animal or vegetable, and we remain helpless for a longer period than any other creature. From our first hour we are dependent on others, who influence us from the cradle to the grave, so that every one of us is, in some degree, a social product. We have been made partly by those who have surrounded us, and as no human being can grow up without these influences, it is scarcely worth while even to guess what a human being would be like without them.

But we do know that children a few years old have been lost and have managed to live in a wood or forest. As they have grown up we find that such beings have become less than human. They have missed the human companionship which every one of us needs, though, of course, they had it in their earliest years, or they could never have existed. Such persons can be classed only as idiots. Now, the word *idiot* comes from the Greek, and means a person who is by himself and has nothing to do with anyone else, or, as John Ruskin puts it, a person entirely occupied with his own concerns.

If we take a grown-up, healthy, sane, intelligent human being and separate him entirely from the company of all other men, he will probably lose his reason and become less than human. The solitary man becomes insane. All

this might be proved and discussed at any length, for it is one of the most important facts in the world. We are in very truth members one of another.

We must again go back to Aristotle, and even to Plato, his master, for the next great truth which we must learn—a truth which follows directly from what we have been saying. It is that a nation is not just a number of people, like a heap of bricks or grains of sand, but is a whole—just as a heap of bricks becomes a whole when the bricks are built up to make a house.

THE GREAT TRUTH THAT A NATION IS LIKE A LIVING BODY

We can see that this must be so if every individual is, in part, a product of all other individuals, and helps to produce the others by direct and indirect influences on them. So we have many phrases to express the idea that, in a sense, a nation is like a great living creature. We call it the Body Politic, or the Social Organism, and sometimes figure it as a noble woman. This comparison of a nation with the body of a living individual is a very valuable one.

Elsewhere in this book we read that, though an atom is a whole, it is made up of parts called electrons, and we are only now beginning to understand the atom, because the key to every fact about it lies in the nature of the electrons that make it. On a higher plane we learn that the living body, though it is a whole, is made up of parts called cells, which are themselves alive; and we have only begun to understand the living body since we learned something about the nature of the cells which make it up.

HOW OUR OWN BODY HELPS US TO STUDY THE LIFE OF A NATION

So, also, we may imagine that the nation is a living body, but we shall never really understand the life of a nation till we understand the nature of the persons who make it up. That is the great key which governs all true thinking about a nation; and that is why we have been very carefully studying the lives, the bodies and the minds of ourselves, so as to lead up to the study of the nation of which each one of us is a part.

Now let us go a little more carefully into this comparison between the individual and a nation made up of many individuals, or units. In studying the history of life we find that the very smallest living things consist of only a single cell. Then there are living things consisting of a few cells all alike. In higher forms of life there are cells, few or many, which are different. In our own bodies, for example, there are billions of billions of them. Some of these cells do one thing and some another. The same is true in a nation. In a nation the term usually employed is "division of labor."

This division of labor does not mean merely that when there is a lot of water to be carried from one place to another the labor is divided among ten men, each of whom takes a bucket and runs backward and forward. It means, so to speak, that one man grows rubber and another manufactures rubber hose; that another gets iron out of the earth, while another makes iron into faucets; so that by such a division of labor the work is done far more easily than if all men did the same thing. Now, when a great Frenchman was studying the life of the body he saw that this division of labor occurs in the individual body just as it does in the body politic; and so he called it the *physiological division of labor*, by which name it has been known ever since.

THE LIFE OF THE BODY AND THE LIFE OF THE NATION

Now, with this key we can begin to understand many things. A nation has to live just as the body has to live. It has to have men to guide it, and the men who guide a nation correspond to the nerve-cells of the brain. It has to have men who make special things for the nation, and the manufacturers correspond to the gland-cells of the body. It has to have people like soldiers, scavengers, doctors and nurses to protect it from enemies inside and outside; and the bodies of these protectors correspond to the white cells of the blood, which kill microbes, remove dirt from the air-passages, and carry medicine and food to the parts of the body that have been injured.

The body could not exist without the division of labor; and the division of labor could not be carried on as it is unless the cells of the body were different. A nerve-cell cannot do the work of a red blood-cell, nor a red blood-cell that of a nerve-cell; and neither of them can do the work of a muscle-cell; and any of the three would make a very poor cell to cover the outside of our teeth. So we

might go on endlessly. But the point is that this is precisely true of a nation. If all the cells of the body were born the same, it could never be a body at all; and if all men were born the same, they could never make a nation.

THE DIFFERENCES IN PEOPLE THAT MAKE FOR THE GOOD OF THE NATION

Fortunately all men are born more or less different; our faces are all different, and it is now beginning to be seen that this difference in our faces corresponds to deeper differences which are in all of us. It is true, or ought to be, that we are all born equal in the sense that we all ought to have an equal chance, but nothing is more ridiculously untrue than to suppose that all men are by nature born equal, unless it be to suppose that they are by nature born the same.

We are all born different, and, as for equality, we are born on very different levels by nature. But this is necessary and right. One man has great strength and endurance, but nothing else; we cannot say that he is equal to a man who is a great thinker. But that great thinker may be very weak and puny. Each can help the other. Ages ago the Emperor Marcus Aurelius declared that, instead of disliking or despising people who are different from ourselves, we ought to say, "The universe has need of them."

A more modern way of saying this is that "it takes all sorts to make a world." It certainly takes all sorts of cells to make a human body, and in the same way it may be said that it takes all sorts of human beings to make a nation. One of the first needs for any nation is to realize these truths. We must learn that we are all dependent on one another, as regards our particular nature and also as regards the particular kind of work we have to do.

THE FIRST AND GREATEST DIVISION OF LABOR THAT MUST ENDURE FOREVER

Ages ago, in rude and savage tribes, though there always was division of labor, there was not nearly so much as there is now. The first and greatest and most eternal division of labor, which is that between men and women, must endure forever.

There was also a certain amount of division of labor between young and old, between the skillful and the strong, between the enterprising and the stay-at-homes. But, just as the difference between a low form of animal and a high form of animal is to be found in the greater division of labor in the higher animal, in the same way we find that high nations cannot exist without increasing division of labor.

More and more people become specialists, just as the five or six different kinds of white blood-cells are specialists, and all white blood-cells taken together are specialists as compared with other blood-cells, and all blood-cells together as compared with the rest of the body. This division of labor, or making of specialists, is a very great fact.

WHAT WOULD HAPPEN IF THE PARTS OF OUR BODIES QUARRELED

There is a famous old story of a revolt in the body, when the other parts of it said that the stomach did no part of the work and got all the food. Of course, we see that that would be a very foolish thing for the body. It would be just as bad for the body if the stomach revolted and said it would keep all the food it received. The stomach would get indigestion and the rest of the body would starve.

That is exactly what happens when rich men seize all the wealth and will not use it for the rest of the community. And so we learn that one part of the body and one kind of cell ought not to be at enmity with another part of the body and another kind of cell. A house divided against itself cannot stand. Doctors know that perfect health is perfect harmony. It means that every part of the body, like every part of a wonderful machine, is serving all the rest and is being served by all the rest, because it is doing its own work rightly in beautiful harmony with all the others.

The great truth we learn from this is that he is an enemy of the nation who stands for any part of it against the others, unless, of course, the others are injuring it. It must be an injury to the social body to set religion against religion, or class against class, or school against school.

In some distant day, the dawn of which can only be seen by the prophet's eye, the eye of faith and hope, men will learn that what is true of one nation is true also of the whole of the nations which we call mankind. They will learn that, as to oppose one part of the body against another is to injure it or to destroy it; that as strikes or labor wars injure the social

body, so wars between nations injure that mightiest body of all, the living body which we call humanity.

THE LIFE OF THE NATION THAT GOES ON WHEN MEN PASS

We have now learned the great truth that civilization and human progress depend on human variety. This has the tremendous meaning, which no nation has yet realized, that, instead of taking all our children and giving them all the same education, we must find out what each child is best fitted for and must educate him for that. Much of the unhappiness we see in the world about us arises from misdirected education.

As we go on thinking about a nation we see that there is one fact which is more important than all others. It is the fact that, though death comes to all the individuals which make up a living nation, the life of the nation persists. This brings us to the great truth which stares us in the face, that the destiny of a nation depends on its parenthood and childhood. It depends partly on the number of children that are born, partly on their quality, and partly on the care that is given them.

Those who have read this story of their own life from the beginning will have learned that there is no wealth but life, and that for every country the all-important fact is, not so much the kind or number of ships that are being built for it, but the kind and number of boys and girls that are being reared to health and strength so as to become useful citizens when they grow up.

THE FORCE OF A PEOPLE THAT EVERYTHING CAN RESIST

Everything depends on the people. All history teaches this lesson, telling us that the force that lies in a people sufficiently strong and numerous is an irresistible force which nothing has ever yet withstood. The pressure of a great people seeking room for its expansion makes the pressure of the steam that drives a floating city across the Atlantic insignificant in comparison. Nothing has ever resisted this expansive pressure—no laws, no tariffs, no mountain ranges; not even the untracked and stormy ocean, with nothing more than the possibility of land beyond it, has yet sufficed to restrain this force in the history of the world.

There is nothing in the world to-day, there is nothing in all its history, more striking than the pressure of the world's population on the space at their disposal. And this pressure is forever going on, for children are always coming, and population is always growing. A nation's children are its greatest wealth. On them, and on their character as good citizens, depends the future of the country more even than on its industries, though they also have a great effect on national character, and healthy modes of life.

Perhaps the children who read this book, and this story of their lives which has been dedicated to childhood and the future, will believe in education when they grow up. Perhaps they will become members of an education party, teaching real patriotism to our people; perhaps they will say when economy is to be practiced: "Practice your economy everywhere else first, but last of all, or better, not at all, on the children and on the education which they require to make them citizens of any nation that can live in the coming world." We must worship God, and not mammon—life, and not gold. Gold is for life, and not life for gold. In any bargain the all-important question is not how much gold is passing but how much life is passing, and in which direction it is moving.

THE PRECIOUS GIFT OF LIFE THAT IS GREATER THAN GOLD

We have been studying the story of our lives; let us remember a story told by Ruskin of a man who had forgotten what we must learn. In the wreck of a ship on the way from California one of the passengers fastened a belt about him with many pounds of gold in it. He was found afterward at the bottom with his belt around him. Now, as he was sinking, had he the gold or had the gold him?

It is worth while asking ourselves a question like that. Life is more than gold; life is infinitely more than anything else it has ever seen or known in all its wondrous march from lowly depths to the marvelous heights it has now reached. For us the opportunity comes to be worthy of it, worthy of its powers, worthy of its happiness, worthy of the glory that awaits us when Life shall lead us onward to our destiny. Children of men are we, but not that only; it is our glory and our pride, our unspeakable joy as we go on our way through the world, that we are not children of men only, but children of God.

THE END OF THE STORY OF OUR OWN LIFE.

Photo, G. P. Abraham, Keswick.

LITTLE AGNES OF THE SNOW

CONTINUED FROM 6396

UP among the mountains in the Lake District of England, shown in this picture, there used to be a cottage where a man named Green dwelt with his wife and children. Agnes, the eldest, was nine years old when, one day in winter, her father and mother went to an auction in the neighborhood. The weather was fine when they started, and they kissed the children and told Agnes to look after the five younger ones, saying they expected to be back during the evening.

But, as gloaming came on, a thick mist settled down over everything, snow began to fall, and the children peered out into the gathering darkness and longed for their parents' safe return. Agnes was a brave little girl, and she did her best to take care of her brothers and sisters, gave them their supper, put the baby twins to bed and talked to the others to prevent their crying for their mother.

By this time the snow was falling thick and fast, and soon it covered the path, and white lines showed under the door and through the crevices of the windows. Still there was no father or mother. At twelve o'clock Agnes heard her two brothers and her little sister say their prayers, and then all crept into bed.

Next morning the cottage was nearly hidden by the snow, and still there was no sign of father or mother. Agnes busied herself dressing the children and getting their breakfast. Opening the door, she gazed on the mountains covered with snow. Could she get through that snow? Suppose her father and mother were lying in it just a little way down the path there. Should she try to find them? She shouted, but there was no reply, and she dared not leave the little ones.

The third day dawned. The snow was falling faster than ever, hissing as it came down the chimney, and nearly putting out the fire. Still the children were alone, shut away from father and mother and the whole world, while the brave Agnes looked after them as well as she knew how.

By the next morning the snow had ceased falling, and little Agnes made up her mind to go forth to find out about her parents and to get provisions for the little family. She could not cross the beck but went a long way round to Grasmere. She told her story, a search-party was formed, and her father and mother were found dead in the snow. Everyone who heard the sad story and knew of the bravery of Agnes was anxious to help the orphan children, and they were well looked after.

THE TALE OF A SLAVE

IF ever you go to Algiers you will hear the name of Geronimo, and this is the story they will tell you.

Geronimo was an Arab, a native of Algeria, where he was born in the middle of the sixteenth century. He was taken captive during an expedition made by the Spanish garrison of Oran, and was baptized into the Christian faith. When he was eight years old, however, he managed to escape and rejoin his friends. Persuaded by them, he then renounced his new religion and became once more a Mohammedan. But the teaching he had received during his captivity had made a deep impression upon him. He returned to the Spanish garrison and became a Christian.

Some time afterward, however, when out in a boat, he fell once more into the hands of enemies, this time a band of Moorish pirates, who carried him to Algiers and sold him as a slave in the market place of his native city.

Now, when he and his fellow-captives were standing in the slave-market wondering whether they would have kind masters or cruel, Geronimo was singled out on account of his manly bearing by an agent of the Governor of the city, who paid the price demanded. His master proved to be a stern and cruel Mohammedan, who demanded that he should give up his faith. Those who accept this religion think that they commit sin if they do not try to make all around them accept it also, and will go to any lengths to carry out their purpose. Moreover, he did not consider that a slave had any rights aside from his master. He bade his overseer see to it that the new servant turned from his former beliefs.

This, however, Geronimo firmly refused to do. His master became infuriated, and treated him with great brutality. When he found that this had no effect, he offered him great rewards and even liberty itself if he would do as he wished. But Geronimo remained steadfast.

About that time a new fort was being built and Geronimo, with other laborers, was working there. Part of their duty was to make huge blocks of cement for the walls of the fort. The process was this: the cement was mixed in great quantities, much as it is to-day, and then shoveled into big wooden boxes. When it had set, the boxes were removed, and the solid masses were carried away and placed in position.

One day as the Governor strode among his workmen his eye fell on Geronimo. It occurred to him that a terrible instrument lay ready to his hand. He would give his slave another chance of renouncing his religion, and if he refused, he should be buried alive in one of those boxes of cement.

Geronimo was brought forward and given his choice. He refused. The Governor, beside himself with fury, ordered the brave fellow's hands and feet to be bound, and the cruel sentence was carried into execution. The great block of concrete, with the heroic slave imprisoned inside, was placed in the wall of the fort. Geronimo was calm and brave to the end. As the deed was finished, the Governor, who, perhaps, had hoped in his heart that Geronimo would not hold out, was heard to exclaim: "I never thought that dog of a Christian would die with so much courage."

The event reached the ears of one of Geronimo's old friends, a Spanish monk named Haedo, who wrote it down. This was in the year 1569. Nearly three hundred years after, in 1853, it was found necessary to destroy the fort, and the man in charge of the work determined to see if the story of Geronimo were true. After much patient digging and searching his labors were successful, for on December 27 in that year he discovered the martyr's remains inclosed in the masonry as had been described by the old monk three hundred years before.

The bones were carefully removed and interred with much pomp in the Cathedral of St. Philippe, where they rest to this day in a marble tomb.

As a further memorial of Geronimo's splendid fidelity and courage, liquid plaster of Paris was run into the mold formed by his body in the concrete wall, and a perfect model, showing not only his features but also the cords that bound him, and even the texture of his clothing, was produced. This now lies in the Government Museum at Algiers, and that is why, if you go there, you will hear the story of Geronimo, one whose spirit could not be enslaved and who counted such freedom worth any physical agony.

THE BOY ON THE BURNING DECK

FROM Corsica came a youth, the boy who "stood on the burning deck," and whose fame is known to all through Mrs. Hemans' poem, given in one of our poetry sections. The Corsicans say that he was Giacomo Jocante Casabianca, a middy who sailed in the Orient, the flagship commanded by his father, with the French fleet that Napoleon took to invade Egypt.

On the evening of August 1, 1798, Nelson sailed up to attack the French vessels as they lay in Aboukir Bay. Part of his fleet got between them and the shore, and he was able to fire on them on both sides at once.

The English guns were pointed for hours at the Orient, the finest ship of the fleet. Broadside after broadside was fired at her, yet the French flag kept waving, until from Nelson's Vanguard a deadly fire wounded the captain, and set fire to the vessel. Inch by inch the flames drove back the sailors, and one by one they reluctantly abandoned their guns. Then Casabianca's father, mortally wounded, but still at his post on the quarter-deck, gave his last order to the faithful defenders of his vessel to abandon her.

Begging him to come with them, they sprang into the water, where many were saved by the English. It was now between nine and ten in the evening, and the flames crept on, while the boy urged his father to jump into the sea with him. The father refused to desert his ship but prayed his boy to leave him. The son leave his father! No. That was impossible for a Casabianca. He would die with him.

And so the two stood calmly hand in hand, while the flames shot up from the portholes, and the deck caught fire beneath them. At last the end came, when with a thunderous explosion the burning vessel sank forever beneath the blue waters of the Mediterranean.

THE DEVOTION OF A KING'S DAUGHTER

KING LOUIS XII of France had a daughter, Renée, who became Duchess of Ferrara, in Italy, and a Protestant. She was always eager to help those in trouble. It is said that she aided more than ten thousand destitute French soldiers passing through Ferrara from the wars in Italy, and her castle of Montargis became the refuge of the persecuted Huguenots.

One of these, the Prince of Condé, had been imprisoned by the Duke of Guise; but he had a devoted and clever wife who, while visiting him in prison, managed to change clothes with him so that she might remain in his place while he escaped to Montargis.

This change was soon found out, but the Duke of Guise was foiled in all his attempts to trace the escaped prisoner. Finally it occurred to him that if the princess were released she would follow her husband, so he gave orders to set her free. His guess proved correct; she was followed to Montargis.

The Duke of Guise, who had great power in the land, ordered the duchess to give up the prince, but she refused to do so. Even when the king, Francis II, demanded the same thing, and sent troops, she still refused. The prince in his little room overheard the brave refusal to surrender him; but he overheard, too, the timorous fears expressed by a few of the guards, and, turning to these, he cried that since they had not courage to defend him, his death should remove their fears. With that, he hastened to the ramparts, intending to expose himself.

Below him, at the foot of the castle walls, he saw the officer of the artillery, and shouted to him that he was the man they sought and that on him alone should vengeance be taken, so that he might die, as he had lived, with honor. Much astonished, the officer sent for his leader, who told him that he must certainly fire on the prince.

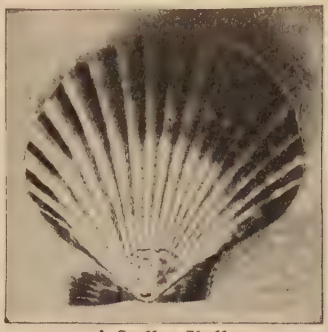
But the faithful duchess stood by the prince's side, and, seeing the cannon directed against her friend, threw herself in front of him, exclaiming:

"Fire on me, and kill at the same instant the illustrious Condé and the daughter of the king you mourn!"

The soldiers, who adored the memory of Louis XII, implored with one voice that his daughter should be spared, and, refusing to attack the castle, marched off to their tents. The prince and his friends escaped into safety that night.

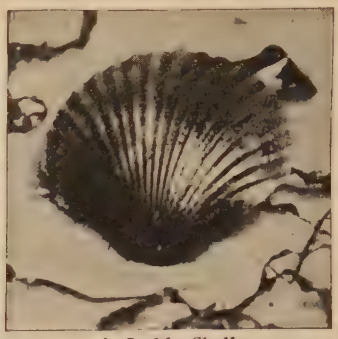
THE END OF THE BOOK OF GOLDEN DEEDS.

CURIOUS CREATURES AND THEIR HOMES



A Scallop Shell.

A Garden Snail.

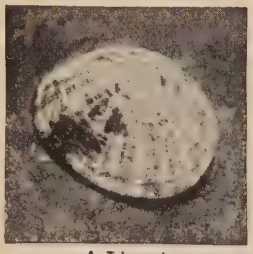


A Cockle Shell.

A Limpet's Sucker.

Paper Nautilus, or Argonaut, out of its shell.

A Ram's-horn Snail.

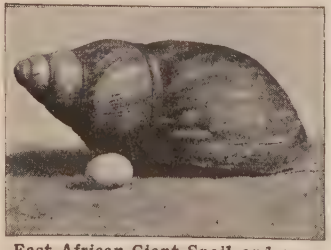


A Limpet.

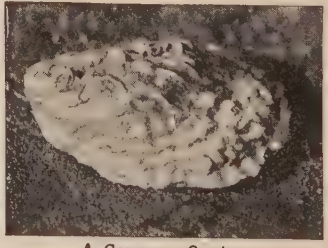
A Periwinkle.

Arion Empiricorum, a black slug.

Arion Ater, a black slug.



East African Giant Snail and egg.



A Common Oyster.

A Swan Mussel.

The pictures on these pages are by Messrs. Berridge, Crabtree, Johnson, Step, Walmsley and others.

Shells of the seashore.

THE GREAT MOLLUSC FAMILY

CONTINUED FROM 6734

YOU know that Britain was a Roman province for about five centuries. In the writings of Julius Cæsar, which you perhaps have already studied, or at any rate may study some day, he gives several reasons why he crossed over from Gaul to attempt to conquer Britain. A late Roman writer, Suetonius, says that these were not the real reasons, but that Cæsar yearned for the pearls Britain was reputed to possess and that he went there hoping to get them.

They may have sufficed to turn the scale. We know that the only article of spoil Cæsar is recorded to have carried home from Britain was a breastplate adorned with pearls, and this he dedicated in the Temple of Victory in Rome. So that shellfish had an important part in the story of the times which brought Britain out of barbarism. They were food and implements to our ancestors in still earlier times wherever they may have lived, and all over the world to-day, where civilization has grown old, they are the raw material of history.

Wherever we examine prehistoric sites great mounds are found formed of the débris of old-time kitchens. There are the bones of the animals the people ate, and among them the shells of shellfish. Even in the absence of bones and implements these old shells in a rubbish mound tell of ancient men and ancient meals.

There are shellfish as near to the North and South Poles as water can go. There are shellfish in the tropics. There are shellfish round the shores of every desert island where seamen have been wrecked. The shells of shellfish, with their contents extracted, are money in various parts of the world; they are personal ornaments in many lands; emblems of sovereignty in some, part of religious regalia elsewhere.

Yet we do wrong to use the word shellfish, for there is no such thing as a shellfish. The creatures living in shells are not fish. Crabs and lobsters are Crustaceans; oysters, mussels, whelks, snails, slugs, octopuses and the giant squids are Molluscs. About forty thousand species are known, half living to-day, and half known only by their remains in the rocks.

In general, the shell of a mollusc is composed of three layers. The outer is a horny substance; the middle consists of prisms of limy substance, and the inner is a lining of alternating films of different kinds forming a series of microscopic ridges which break up

light as a prism does, so producing the beautiful rainbow effects seen in pearl.

We cannot say from what type of creatures the molluscs arose. In many of the living classes which we have studied we have been able to follow links of relationship. We cannot do that with the molluscs. At some time in the past the power was placed at the disposal of the mollusc to pour out, from that fleshy part of its body called the mantle, a fluid which hardens into the substances forming the shell. The water animals obtained their supplies from lime contained in the sea and fresh pools; the land animals got their material from mineral matter taken up by plants from the soil.

So armor became the possession of one of the humblest orders of life. The plan prospered amazingly. It made the world safe for these lowly animals in a thousand directions. Heavy shells came to be homes for animals exposed to perils not only from enemies which hunt by the shore and the shallow depths of the sea, but against the turbulence of the sea itself, which breaks like thunder on cliff and rock.

We find that molluscs exposed to this kind of violence are defended by massive shells. Molluscs which live in calmer or deeper seas have thinner, lighter shells, as have the animals in our still ponds and streams, and those which move by stealth about the land, subsisting on vegetation.

Snails of long ago which were more than six feet long

So a huge class of animals had their housing problem permanently solved for them: each was born to carry its house on its back. The process meant a slow but sure progress through life; and, as we shall see, certain types reduced their burden. We find that the shells of slugs, cuttles and the rest no longer appear, but have vanished like the limbs of the snake and the hind legs of the whale.

Ancient sunny seas had mollusc forms as big as cart-wheels, with huge sucker mouths. Fossil remains of snails six or seven feet long have been found in England. These old-time monsters were found near Hastings in 1922. They were marvels of natural contrivance, not like modern snails in shape, but long and straight with spirals running round them for the whole of their length. The spirals were sixty feet long when followed throughout their windings.

The giants among molluscs passed away, and the molluscs of to-day fall into three groups. There are those whose shells have been reduced to vestiges, those whose shells are single, and those whose shells are double. The two-shelled, as in the oyster and the mussel, are called *bivalves;* the one-shelled are called *univalves.*

A group of quaint creatures with two shells and no head

To the gourmand the Oyster is the king of molluscs, but to the naturalist, for all its beauty of inner shell and its gift of pearl, it is a degenerate. Unlike that curious young gentleman, little Tommy Noddy, who was all head and no body, the oyster is all body and no head. So are all the two-shelled molluscs. The one-shelled, on the other hand, the snails, winkles, whelks and the rest have heads, eyes and tongues. Let us first see how a bivalve is compounded, and how it earns its daily bread.

The Fresh-water Mussel is a common object to those who probe the mud at the bottom of a stream, but we have had nothing more remarkable in all our studies. Within the two shells of the mussel is a soft mass of flesh and muscle, a broad, flattened ligament which is called the foot, the fleshy mantle which secretes the shell material, powerful muscles for closing the shells, a mouth, gullet, stomach, but no head, therefore no jaws, no tongue.

The mussel protrudes its powerful muscular foot, fills it with blood to make it swell, then pulls itself down into or along the surface of the mud, with such little haste that its best pace would carry it about fifteen feet in the course of the night, when alone it makes its marches.

The valves which help the mussel to maintain its supplies

In order to obtain food the mussel opens its shells and draws in water by the rhythmical waving of multitudes of tiny hair-like *cilia.* These induce a flow of water into the mussel, conveying oxygen and food to the system. A motor-car engine has inlet valves and exhaust valves; the bivalve has its inlet and outlet. Not the least notable of the mussel's organs is one yielding a glossy, silk-like substance which provides cables with which to anchor the animal. We can see these strands binding edible mussels to the timbers and metal of our seaside piers. But note the astonishing rôle which the *byssus,* as we call this sub-

stance, plays in the life-story of the freshwater mussel.

This animal does not broadcast its eggs as the oyster does. The eggs of a freshwater mussel are exposed to such dangers that Nature has ordained that the mother shall incubate them within her body. The eggs hatch in tubular cavities in the gills of the mother; and it is an able-bodied little fellow, clad in a triangular coat of shell sharply pointed at both ends, that says farewell to its mother and takes the plunge into open water.

Its first act is to spin a byssus of sticky thread, which floats up in the water. An inquisitive minnow or stickleback is attracted and draws near. The byssus adheres to it. The baby mussel has caught a fish, but not to eat. The little mussel, excited by the contact, rapidly opens and closes its twin shells, and so swims up to its capture. Reaching the fish, it grips with the sharp extremities of its shell and establishes itself more firmly than the Old Man of the Sea on the shoulders of Sindbad. The terrible old ruffian of the story did but seat himself *on* the children's hero, but the mussel seats itself in the very flesh of its host.

THE STRANGE CRADLE OF THE BABY MUSSEL IN FRESH WATER

The irritation caused by the hooked shells causes a morbid growth of the fish's flesh, which, developing like a gall, imbeds the little mussel and makes it prisoner. That is exactly what Nature intends to happen. For three months the larval mussel rests there, traveling wherever its host may choose. At the end of the third month it is a perfect mussel in miniature, and something happens to rupture the cyst in which it is inclosed, liberating the mollusc, and permitting it to settle down at the bottom of the water placidly to follow the business of the perfect bivalve. On the other hand, the eggs of the Sea Mussels are cast into the water. These mussels are edible and are good food if the water is pure, but are not much eaten in this country.

THE SEA-SPINNERS OF SILK WHICH HELPED TO BUILD A BREAKWATER

The way in which these edible mussels anchor themselves is turned to advantage by engineers. When the breakwater of Cherbourg harbor was being made the engineers threw tons of live mussels upon the works, and left these strange sea-spinners to bind the parts of the breakwater together with their inimitable silken cordage. Gloves have been made of these byssus threads, and we may yet find other uses to which they can be put in manufactures when the search for raw material becomes increasingly acute.

THE BEAUTIFUL LINING OF THE SHELL OF THE OYSTER

The rivers of the United States yield many pearls inclosed in the shells of freshwater mussels, but the finest examples of pearls come from a group called the Wing-shells, which are true pearl oysters, or rather pearl mussels. Our common oysters line their shells with mother-of-pearl, but the pearl oyster forms free globular pearls which lie loose within the mantle.

Such pearls may arise from grit or other foreign bodies in the sensitive flesh of the animal, and are then called seed pearls. The so-called culture pearl is a true pearl, a covering of nacre on something artificially introduced by the hand of man. But the pearl most prized is actually the tomb of a parasite.

It is a story stranger than any the superstitious travelers of ancient days were wont to tell. A certain tapeworm attains maturity in the intestines of a great fish, the Indian ray, scientifically termed *Trygon*. Its larvæ escape into the water and are drawn into the body of the mollusc with the fluid the oyster absorbs.

HOW THE LOWLY OYSTER PRODUCES A PEARL OF GREAT PRICE

There it irritates the oyster and causes it to pour forth a fluid which we call nacre, and which, on hardening, becomes pearl. The nacre flows round the parasite, killing and entombing it. Layer after layer, film after film, is added, and in the course of time, when the oyster is caught and opened, perhaps a fortune is found to lie within.

But not all the parasites are killed in this way. Many lie out of reach of the oyster's sensitive centres and grow till a trigger-fish, which always haunts the home of these bivalves, crunches up a pearl oyster for its dinner, becomes in turn the host of the parasite, which then develops further. It tunnels its way from the stomach into the flesh of the trigger-fish, and there lies dormant in a sort of capsule. Finally the trigger-fish, which has eaten the mollusc, is eaten by a great sting-ray, in which the tapeworm reaches

TWO HUNDRED HOMES MADE BY MOLLUSCS

* Barnacles, though related to the shrimps, make hard shells like the molluscs.

A COLLECTION OF LAND AND WATER SHELLS

Weaver's Shuttle Dipper. | Lesser Shuttle Dipper. | Zoned Dipper. | Pear Dipper. | Turnip-shaped Dipper. | Ribbon Dipper. | Olive Volute. | Four-plaited Volute. | Black-and-white Volute.

Latticed Volute. | Checkered Volute. | Taenia Volute. | Music Volute. | Imperial Volute. | Turbinated Volute. | Ridged Volute. | Horned Volute. | Globose Volute.

Coloquint Volute. | Ethiopic Volute. | Keel-margin Volute. | Flat-ribbed Whelk. | Spotted Whelk. | Rugged Whelk. | Horned Whelk. | Cicatrix Whelk. | Knobbed Whelk.

Ribbed Whelk. | Limpet-shaped Whelk. | Armed Whelk. | Globose Whelk. | Broad-belted Whelk. | Latticed Whelk. | Awl-shaped Whelk. | Javelin Whelk. | Belted Whelk.

Scorpion Screw. | Spider Screw. | Millipede Screw. | Banner Screw. | Eared Screw. | Horned Snipe Murex. | Black-spined Murex. | Branched Murex. | Scorpion Murex.

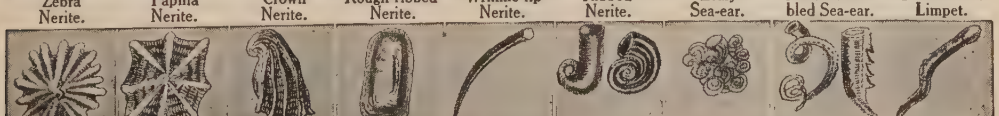
Spiny Murex. | Porcupine Murex. | Spindle Murex. | Nodulous Murex. | Mottled Top-shell. | Beehive Top-shell. | Subconical Top-shell. | Sun Top-shell. | Imperial Top-shell.

Great-tooth Top-shell. | Lineated Wreath. | Golden-mouthed Wreath. | Pagoda Wreath. | Starred Wreath. | Crown Wreath. | Waved Wreath. | Wentletrap Wreath. | Minute-wrinkled wreath.

Berry Wreath. | Lipped Wreath. | Double-plaited Wreath. | Cockchafer Snail. | African Snail. | White-margined Snail. | Goat's-eye Snail. | Plaited Snail. | Snake's-skin Snail.

Turkish Snail. | Grayish-brown Snail. | Zoned Snail. | Red-and-yellow Striped Snail. | Square-tipped Snail. | Mitre Snail. | Smooth flesh-colored Snail. | Venus's-ear Snail. | Chestnut Nerite.

Zebra Nerite. | Papilla Nerite. | Crown Nerite. | Rough-ribbed Nerite. | Wrinkle-lip Nerite. | Ribbed Nerite. | Leafy Sea-ear. | Chestnut-marbled Sea-ear. | Chinese-root Limpet.



White-eyed Limpet. | Star Limpet. | White-ridged Limpet. | Duck's-bill Limpet. | Striated Tooth-shell. | Incurved, Reversed, Glomerated, Serpent and Toothed Worm-shells. | Teredo Shell.

maturity and lays its eggs, and these in due course escape to enter another oyster, and become pearls or parasites again.

The true oyster has its place in literature merely as a course at the dinner table; yet on its own account it is interesting enough to merit a book to itself. If we had an oyster under observation in a tank we should see it draw in water for breathing purposes and to extract the organic contents of the water for food. Then we might be fortunate enough to witness it in the act of depositing its spawn.

THE MOTHER OYSTER AND HER HUNDRED MILLION EGGS

The spawn is, of course, simply a multitude of eggs. The water is discolored by their immense number. A hundred millions has been named by some naturalists as the gift of a mother oyster in one season, and the strictest observation shows that one oyster does produce sixteen million eggs at one time. Within ten hours the eggs are hatched, and free-swimming larvæ are seen to emerge. Soon they sink to the bottom and, if fortunate enough to touch something solid, like a stone or a shell, attach themselves firmly and begin to grow. In a few years they are large enough to eat. If the water in which they grow is impure, they may be carriers of disease if eaten raw.

The discovery has been made recently that these molluscs change their sex from time to time. The mystery is still under investigation, but it seems established that, while the young oyster is likely to be a male, it may change into a female, and then, after laying its eggs, become a male again.

Near by the oysters, as a rule we find the Scallops, larger, handsomer of shell, sometimes fastened to their home by a byssus, frequently roving in search of fairer quarters. They progress rapidly in zigzag fashion through the water, forcing their way by a rapid opening and shutting of the shells. The large shell of the Great Scallop, or Clam, is often to be seen in use at seaside places as a drinking vessel. We must not, however, confuse it with the real Giant Clams, of which there are several species, found only in tropical and subtropical seas. These deserve the name of giant, for the shells of the greatest examples, weighing as much as 500 pounds, serve as little baths among natives.

THE COCKLES THAT HOPPED LIKE LITTLE KANGAROOS

There are also smaller bivalves called Cockles, which, in a perky, active way, are as interesting, for though they hide in the sand, they can hop on their long, muscular foot like bivalve kangaroos. This ability in the cockle was momentarily forgotten by an Australian naturalist who, to his great joy, caught cockles of which previously only fossil relics had been found. He put his treasures on the seat of the boat, only to see them calmly hop right out of the boat and back into the water.

File-shells, so called from the file-like character of the shell, are common to our waters, and interesting from the fact that this mollusc, like the caddisworm, erects around itself, when stationary, a collection of broken shell, mineral fragments and other débris, binding all together with its byssus into a capital little fortress.

The name clam is applied in different places to different species. In America the best known are the Round Clam and the Soft Clam. The latter burrows in mud or sand, leaving above the surface a fleshy siphon which serves to draw in water and food for the hidden animal. The British Gaper is much like it. Next to them come the Razor-shells, common on our shores. Here the two shells are long, thin and narrow, ideally fitted for quick descent into sand or mud, the motive power being supplied by the foot, and the outline of the shells affording the least resistance to such progress. Some of the razor-shells mine soft rock, but for the highest power in this direction we must pass to a fresh suborder, the piddocks and the teredoes.

THE WONDERFUL TUNNELS MADE BY THE PIDDOCK IN THE ROCKS

The Piddock, whose scientific name is the *pholas*, is unrivaled among molluscs as a borer of stone, timber and other substances. It is very ancient, and must have played an important part in shaping coast-lines. Piddocks destroy wood and they bore tunnels in stone and rock year after year, century after century, letting in water to fret away the rock and bring it crumbling down.

The mollusc which we most dread, however, is the Shipworm, or Teredo. Present in practically all seas near the shore, it is a long worm-like animal with two small shells at the head which serve it

for boring implements. The larvæ are free swimmers, which, coming in contact with wood of any sort, attach themselves to it and tunnel, not to eat the wood, but to fashion a home for their soft bodies.

The teredo has become an enemy of navigation and the marine arts of man. For uncounted years it tunneled and broke up trees and driftwood brought down the rivers, which threatened to dam the waterways, flood the surrounding land, and convert land into marshes.

Man in due course took the sea with his ships of wood, built himself little piers, fenced out the sea with the trunks of trees and hewn timbers. His works and his vessels appeared where the teredo had long been accustomed to see a home in any timber brought into contact with the sea, and it took to his possessions with the rest. It bored the hulls of his ships and became the terror of the mariner. It attacked the timber work of harbors, causing slow but enormous damage.

Less than two centuries ago these so-called shipworms endangered the existence of Holland. It was discovered that the teredo had eaten far and near into the timber defenses of the land, and terror seized the little nation which had never feared human armies on land nor enemy navies at sea.

BRAVE EXPLORERS SENT TO THEIR DOOM BY THE LITTLE TEREDO

In the long record of world exploration the teredo, it is supposed, accounted for many a little ship which sailed to the tropics on the other side of the world and vanished forever from knowledge. When at last it was recognized that no chemical treatment of timber could keep the teredo at bay, copper sheathing for the hulls of ships was applied, but copper sheathing was apt to be torn away, and wherever that happened, in went the deadly teredo, to work secret damage, till perhaps the good ship went down with all on board.

There we will leave the bivalve molluscs, and pass to a higher group, the univalves or one-shelled molluscs. The connecting link is found in the Tusk-shells, which, beginning life with two shells, mature with one, but with a head. From round about the head project many delicate filaments which are protruded into the water to catch microscopic types of life. They are called tusk-shells, not because they have tusks, but because their shells resemble tusks in outline.

Another intermediate step between the two-shelled and one-shelled molluscs takes us to the Chitons, or Mail-shells—animals in which the shell is in eight hinged segments, with chitin on the upper surface and shell on the under-side of the plates. The hinged scheme of armor suggests the armadillo and the wood-louse, and the chiton, like those two creatures, rolls itself up when threatened.

THE HOUSE OF THE SNAIL WITH ITS LITTLE FRONT DOOR

From this point we are in the great company of single-shelled gastropods—the snails, whelks and so on. Here we have a soft-bodied animal set in a shell. The body is marked off into head, eyes, feelers, and a projecting hump in which the vital organs are contained. This part is well divided from the under-part, the great muscular foot, on the upper back part of which appears the operculum, that horny disk with which the animal closes its shell as with a front door. Not all gastropods have this security device, but everyone that has seen a periwinkle realizes its excellence.

THE FORMIDABLE TONGUE WITH ITS MANY ROWS OF TEETH

The most remarkable feature of the Snail tribe, from the popular point of view, is the tongue, or radula. This is a ribbon of chitin fitted with row on row of little horny grapnels which play the part of teeth.

These teeth are arranged in rows across the long tongue, and vary in number with the species. The fewest are found in a sea slug which has less than a score of teeth all told, while the common snail of the garden has a serried array of teeth in 135 rows, one behind another, and 105 teeth to each row—over 14,000 in all. The large pond snail has 12,000 teeth, the small fresh-water limpet has 9,000; the amber shell over 3,000, while a Mediterranean mollusc is estimated to have something like 750,000 teeth.

But of course there is no resemblance between molluscan teeth and the teeth of mammals. They are tiny hooks of horn set in a ribbon of chitin, and are not all used at once. Indeed, a small part of the tongue comes into play at a time, the remainder being kept in reserve at the back of the mouth to take the place of teeth in front which have become worn.

This formidable tongue is protruded by the animal and licks the vegetation or flesh which forms its food. A lion's tongue, when it licks, takes flesh and blood with it. The snail's and whelk's tongue rasps in the same way. A cabbage which has been attacked by a snail or slug looks as if the tissue had been slowly rubbed off, and that is the case; it has been filed away by the snail's rasp, and the part which we miss has gone down its throat.

We need not wonder at that, for the whelk rasps its way through the shell of the oyster and banquets on the contents. Many land molluscs commit attacks of this kind on other gastropods. Some of the slugs and snails are mainly flesh-eaters. Even the vegetarian species may make a change of diet in captivity. In such cases snails, when spring returns with abundant green food, have been known to refuse it, and, missing the flesh which was now denied them, have calmly eaten each other! The great slug *Arion ater,* the monster whose depredations in the garden we all dread, eats worms alive or dead, and eats other slugs alive. It has been known to eat sand containing organic matter, and it will readily turn from vegetation to devour plant-lice and other insects.

THE SILVER TRACK MADE BY THE SLUGS AND SNAILS

The slug, therefore, is a friend as well as a foe, a scavenger as well as a robber. The same may be said of certain of the land snails. They are known to eat beetles, other snails, fungus, and lichen. All slugs and snails make their own track of slime along which to glide, and it is by their glistening traces that we follow them. Where food is plentiful they go and return with great regularity, and where slugs and snails have been, slugs and snails will be found year after year, the same snail, year after year, if it be not disturbed.

Snails can seal their shells with a form of mucus which hardens into a covering for the winter; slugs can envelop themselves in slime. That slime they can convert into cables. In the water there are molluscs of this Order which spin a thread in the water, attach it to the surface, apparently by a depression in the upper end of the line of slime which admits a bubble of air, and so floats with buoyancy enough to hold the animal at the distance below the surface at which it desires to remain. That enables us better to grasp what follows.

THE SLUGS THAT DEFEATED MEN IN A BATTLE OF WITS

In a conservatory slugs played havoc with precious orchids, so the plant-pots were placed in bowls of water and the plants themselves were enveloped in wadding, over which even the slimiest slug may be supposed incapable of traveling. But were the slugs defeated? No, they climbed the rafters of the conservatory and let themselves down by threads of slime on the flowers of the orchids.

These gastropods are marvels of endurance. They exist far up in the Arctic Circle; they flourish in the desert, where plant life is sparse and almost non-existent. They hibernate through the bitter winter; they bury themselves and sleep, fasting during the torrid heat of summer. Moisture brings them out in such myriads that people imagine they have arrived on the wings of the wind. If all favors them, they live about five years, so far as observation goes, and they may live much longer.

THE STRANGE THING THAT HAPPENED IN THE GLASS CASE OF A MUSEUM

The suggestion is prompted by an extraordinary occurrence in the Natural History Museum at South Kensington, in London, where two desert snails, whose scientific name is *Helix desertorum,* were brought home from Egypt, where they had been in the possession of their finder some time before arrival in England. Supposed to be dead, they were fast gummed down, like other exhibits of the kind, to the usual tablets and left in their show case. Five years passed with nothing to indicate the faintest flicker of life in either. Then chance led to an examination, and the discovery was made that one of the snails had been newly repairing the crust which closed the entrance to its shell. Both the snails were taken out and placed in tepid water. One revived and began repairing the lip of its shell which had been damaged in fixing it to the label.

Snails have been found in the Sahara sands where the day temperature was 122° Fahrenheit, where no rain had fallen for five years. Others kept without food or water for four years in a collector's drawer were placed in water and revived; and six months later one of them was the mother of thirty baby snails.

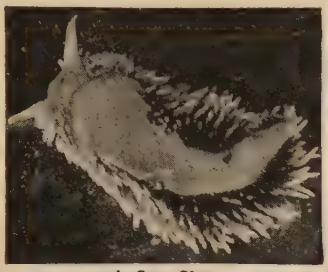
We must go down to the sea for other treasure and spend a few minutes with the Limpets. Here the shell is single, but conical, not a spiral like that of the snails and periwinkles. There are many kinds, but the common limpet is as interesting as any. By pressing its powerful sucker foot on the rock it gets such a grip that it can scarcely be detached by a direct pull. Sideways it may be suddenly wrenched from its grip, but not if it has warning of impending danger.

A good naturalist took advantage of this fact to save his life. He had fallen into the sea in Scotland in a deep, rocky place out of which it was impossible to climb owing to the slippery steep rocks. Drowning seemed inevitable with the rising of the incoming tide. Fortunately he noticed some big limpets clinging to the rocks, and he knew their power.

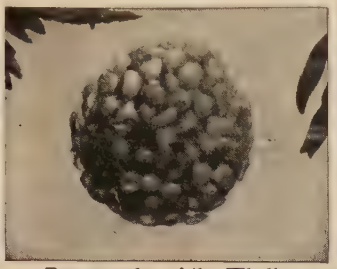
But they had to be made aware that they were likely to be dislodged by sudden pressure. So he gave each of them a sharp tap in turn. They clung with might and main and he climbed up on them, using them as stepping-stones to safety.

The limpet secures its hold not only by means of its great muscular foot; somehow it manages to scrape or erode in the rock a hole exactly matching the outline of its shell. Whether this is done by a cutting action or by the aid of an acid which the creature secretes, is not yet certain, but the acid theory has high authority for acceptance.

For limpets to stick is a proverbial performance, but they do not remain stuck. They move with each tide, down the rock to scrape off with their tongues the fine weed growing on the stones. Then each limpet returns to its own niche, never mistaking another's. It would be



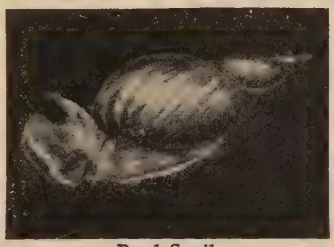
A Sea Slug.



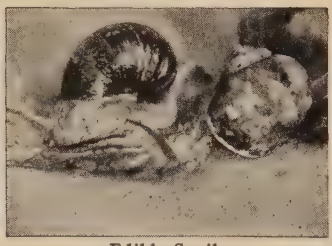
Egg capsules of the Whelk.

Whelk Shell.

Roman Snail.



Pond Snail.



Edible Snails.

Piddocks.

Razor-shells.

useless to attempt to invade another limpet's home, for no two are exactly alike, and each must fit into its own retreat. Yet every common limpet is blind!

THE GORGEOUS COLORING OF THE COWRIES OF TROPICAL WATERS

Wentle-traps, very beautiful of shell; Murices, which bore through the shells of other molluscs and secrete a fluid which gave the ancients their famous Tyrian dye; Whelks, which tunnel the shell of the unfortunate oyster; Periwinkles, which teem among the seaweed and other vegetable débris between high and low tide; Cone-shells, remarkable for beauty and of high value in the market—these and scores of other species are in our present group, in which one other eccentricity must be noted in the Pelican's Foot, a shelled mollusc not distantly related to the cowries.

No more lovely coloring is to be found than among the Cowries, though why such charms should be lavished on their shells is not obvious, for the fleshy mantles cover a great part of the shells. Then those mantles again are of the richest hues, an extravagance of rival charms of hue competing in the same mollusc.

As already remarked, certain kinds of cowry have been long used as money in primitive parts of the world. Gradually their use declines as metal makes its way as a currency for natives, but the cowry has had a value as the equivalent of gold, silver and copper for more years than history is able to recount.

THE TRITON SHELLS WHICH THE ROMANS USED AS TRUMPETS

Beautiful natural architecture and coloration are found again among the Wing-shells and the Fountain-shells; the fountain-shells, four or five pounds in weight, being ground to make porcelain, or used for cameos. Helmet-snails are taken from the sea to serve the cameo-cutter, too, while the Tritons served the Romans as a trumpet, and in the South Sea Islands to-day answer as a war clarion among the natives.

The most notorious of all the molluscs, the cuttle-fishes and their allies, have already been dealt with in our story of deep-sea life, but we must note their nearest kindred, the Nautilus, sole survivors of a race with which the seas once teemed. The nautilus possesses a shell, and lives in its outermost chamber, not in the whole of it. The foot round about the mouth has numerous tentacles which can be withdrawn into shields.

In its youth the nautilus occupies a shell shaped like a horn, but as it develops, the shell becomes a chambered spiral, and the fleshy body, continually drawn toward the opening, leaves the earlier parts of the shell. The later developments wind round and inclose the earlier, and the central chambers of the shell become filled with a natural gas. The exterior of the shell is covered with a thin membrane which is removed when the animal has been caught, to reveal a substructure of sheeny mother-of-pearl.

THE OLD LEGEND OF THE NAUTILUS WHICH MISLED THE POETS

Ancient tradition attributed to the nautilus the power of raising its arms to the wind and swimming with them as sails. Poets and others remember the legend and still accept it as truth. The fact is that the nautilus propels itself through the sea by squirting out water in the same manner as a cuttle.

The Paper Nautilus is a different animal. Only the female here has a shell, and that exists simply as a cradle for her eggs, one of the loveliest cradles in the world, a charming evidence of the care and genius, we might almost say, of Nature in providing for the safety and well-being of the defenseless young of a species.

Closely related to the limpets are the members of the Haliotis Family, or Ear-shells, to which the familiar Abalone of the Pacific coast belongs. This creature is very common along the coast of California and in most warm seas. It is not found, however, along the Western Atlantic. In the English Channel the species popularly called the Ormer is common. You can see two or three haliotis shells in our colored plates of shells.

The Abalone, which sometimes grows to considerable size, has a shelf like a flattened saucer. It creeps about the rocks near the seashore, feeding upon seaweeds. It pushes its fringed mantel from underneath the shell, and through a row of holes it stretches its tentacles. When alarmed it withdraws entirely under the shell. The colors in the inside of the shell are beautiful. Many are used for coloring or the manufacture of small ornaments and cheap jewelry. The animal itself is much eaten by Orientals, and many are dried and sent to China and Japan.

THE NEXT STORY OF ANIMAL LIFE IS ON PAGE 7059.

BEAUTIFUL SHELLS OF THE WORLD

These pictures of shells of land, sea and river have been drawn from nature, and give some idea of the wonderful workmanship of their humble builders. A single shell is a work of art, but it is only when we see many together that we fully realize the beauty of their form and color. Most of the shells on this page are European, but some are common with us. Many have only difficult Latin names, but in the centre we see a Scallop, with the Striped Snail on its left, the Razor-shell underneath, and the

Pond Mussel under that to the left. The first shell on the page is the Lined Scallop and the last is the Sea Mussel. The big shell at the top is the Haliotis, and on the left of it is the Painter's Mussel. In the centre of the bottom is the Whelk. Under the striped snail is the Common Periwinkle, and under that again is the Horse Mussel. The pretty little pink shell on the left of the razor-shell is a Trochus Magus, and the curiously shaped shell on the right of the razor-shell is a Pelican's Foot. In the top right-hand corner is the Danicus Scallop, and under it the Tiger Scallop. Many of these will be clearly recognized.

You may recognize more of the shells on this and the two following pages, though but few of them have English names. The first is a Voluta, then come two little relatives of the Whelk and a Cone Shell, named from its shape. At the top on the right are three different kinds of Snails, and in the middle is a large Cowry, with a Scorpion Shell below it looking very spidery. In the bottom left-hand corner is a Wing Shell, and three snails are above it. In the bottom right-hand corner is a Turbinella, with two large Land Snails on its left. The beautiful heart-shaped shell in the bottom row is the Heart Cockle, and on its left is a little Scallop.

The first shell on this page is a Ducal Boat Shell. The queer-shaped ones like boats, top and bottom, are Aviculas. The spidery shell in the middle is a Spondylus and the group above it are Naticas, or Butterfly Shells. The green shell on the left like a pointed cap is a Trochus, and so is the one below it. The little spotted shell under the spondylus to the left is a Bishop's Mitre. The second shell down on the left and the two in line with it are Pheasant Shells. In the bottom left-hand corner is an Ampullaria, and in the right-hand corner a Black-mouthed Tun, with a trochus next to it on the left and another trochus above it. The four shells in a row above the avicula at the bottom are different kinds of Neritas.

The long spiky shell in the middle near the top is the Murex, often called Venus's Comb, and is the source of the ancient dye known as Tyrian purple. Another murex is immediately underneath this, but though it has projections, there are no sharp spikes as in its relative above. The big shell at the bottom, under the smaller murex, is a Bulla, or Bubble-shell. On the left of the spiky murex is the Nautilus, with a Haliotis below. The four long tapering shells in the middle are Terebras, or Boring Shells. Along the bottom on left and right are several kinds of Cowries. The shell halfway down on the right, like an ear, is the Ear-shell. These pictures do not, of course, show the shells in their natural sizes, but reduced.

FOREWORD FOR THE STORY OF MUSIC

EXPERIENCE has proven to me that music is a language which can be understood by all people, young, middle-aged or old, but they will understand and interpret it according to the emotions which they can feel and demonstrate at their respective periods of development. At my Young People's and Children's Concerts I find my audiences extraordinarily receptive to the most subtle expressions of feeling in the music which I explain and play for them. We all know that the joy of children is just as intense as our own, although it may be evoked by a different cause. The same is true of sorrow. The little girl whose doll is broken is just as tragically unhappy for the time being as a mother who has lost her child, although luckily the sorrow of the child is soon over and lost in the devotion to the next doll. I have therefore found it easy to make children realize that music is a language capable of demonstrating and beautifying the entire range of feeling which God has placed in the human heart. Children are equally quick to appreciate the evolution of music from the earlier times down to the present day.

Mr. Lawrence Jacob Abbott's article on the development of music is so able, and tells the story in such clear accents, that it can be appreciated not only by children, but those children of a larger growth who have not had opportunities for appreciating the greatest of all arts, which is now brought within the reach of all children who live in our larger cities. I congratulate the Grolier Society on having obtained so able an expression for its Book of Knowledge.

Walter Damrosch.

THE DEVELOPMENT OF MUSIC

I. THE BEGINNINGS AND GROWTH OF MUSIC

CONTINUED FROM 6776

A PRACTICAL joke was once played on a great musician by a friend of his. One morning while this musical genius was still lying in bed his friend started to play a composition on the piano. He played it loudly enough to attract the musician's attention, and continued right on up to the very end. Then, just as he was about to sound the finishing chord he stopped. It was as if he had left the piece hanging in midair. The musician waited long for the last chord to come. Not a thing happened. Finally, in desperation, the disturbed man jumped out of bed, hurried downstairs to the piano, and finished it himself!

So responsive was he to the powers of music that cutting off the end of that piece was just as painful as cutting off his own little finger. Most people are not so sensitive as that. But, to some extent, music has the power to move all of us. Who, for instance, has not thrilled at the roll of the drums and the blaring-forth of brass instruments as the military band comes marching by? And music has so many different forms that it can affect us in a thousand different ways. The huge symphony orchestra of a hundred men that plays so impressively, the dance tune that makes our feet want to keep time to its rhythms, the big church organ with its solemn tones, the strange music of the opera, the cheerful little melodies of the hurdy-gurdy, the queer strains from far-off lands such as China and Egypt—these are but a few of the many kinds of music that affect us.

Some of it is good, some is bad. What is the difference between the two that makes us enjoy one and dislike the other? When we start to think about it we become very curious to know more about this strange and wonderful thing—music. Was it always in the form in which we know it? If not, where did it come from in the

beginning? How did it grow and change? To know a little of the interesting story of music in other lands and other times will give us more pleasure when we hear the music of to-day.

Back many centuries ago, among the primitive and savage races of mankind, the beginnings of music gradually took shape from the rude shoutings of men. How it did this will always be a matter of guesswork, but it is quite certain that singing of some sort came before any musical instruments were made. Probably hunting-calls or other vocal signals used in primitive life pleased the fancies of the people and began to be used for amusement. Perhaps the calls of the birds, the sound of the brook, or the whistling of the wind gave men the idea of imitating the sounds of nature. The picture shows primitive man making a sort of instrument of his arm by crooking it and chanting into the hollow. At any rate, the oldest music of which there is any record is a lament, or funeral chant, called by the Egyptians the "Maneros."

Primitive Chant, by H. A. MacNeil.

The tones which are used in all music of modern times seem so natural to us that it is hard to believe there was ever music based on a different system of tones. Yet, just as man has tried out all sorts of clothes, from the bearskin to the dress-suit, many kinds of scales, or arrangements of tones, were used before man finally discovered the form of music which pleased him best.

On the modern piano we are at liberty to strike eighty-eight different notes. Yet scientists have found 11,000 tones which can be told apart. What a small number, after all, musicians have chosen, to the exclusion of all the rest! If these cast-off tones are used by mistake, the music is said to be "out of tune." Thousands of years ago, however, these strange tones delighted the ears of savage peoples.

THE WONDERFUL PATTERN OF NOTES IN MODERN MUSIC

Let us examine our own musical tones and see what they are like. This is easiest to do with the piano. Musical tones are named after the first seven letters of the alphabet—A, B, C, D, E, F, G. Forgetting the black keys which divide the "whole notes" into "half notes," we start at the left of the piano with the lowest note, playing the white keys and naming the first A, the second B, and so on. When we have played seven we have used up the names, and must start in on the eighth with A again and repeat the same letters. Then notice a remarkable thing. No matter on what note we start, the eighth note after it, which is called by the same letter, always sounds strangely like the first. This eighth note is called the *octave,* after the Latin word for "eighth." Each A sounds like a thinner, higher version of the A below it; each C likewise sounds similar to every other C.

From the octave comes our modern scale. The complete scale, using both white and black keys, is made of twelve notes, each just as far apart in tone as the other. As we play from one C to another the white notes alone form our *major scale,* which is bright and cheery. And by changing a few notes we can form the *minor scale,* which is, by contrast, sad and mournful.

This arrangement of tones is based on fact, for Pythagoras, an ancient Greek philosopher, discovered from the Egyptians its mathematical relations, and used it to form the Greek scale. But long before that time primitive nations divided their octaves into minute parts and used third-tones and quarter-tones. On the other hand, the Chinese used only five notes in their scale, corresponding to the black keys on the piano. This is just like the Scotch folk music, which we hear in such tunes as Auld Lang Syne.

You may read more about the relations of notes to one another and the ways in which they are produced in the stories beginning on pages 6437 and 6695.

PRIMITIVE MAN'S WARS AND HUNTS, THEN INSTRUMENTS

But even while vocal music was in a very crude state man began to fashion instruments for himself. By cutting a reed and blowing across it he discovered he could make a musical tone. A long reed produced a low tone, a short reed a high one. Thus were invented the pipes—oldest of all instruments. And as the huntsmen fingered their bows and delightedly

A harp as pictured on a temple wall of ancient Egypt.

found what a pleasing twang they could draw from the strings, the first rude harp came into existence.

The Chinese very early learned the art of music, and invented pipes and stringed instruments which were like primitive guitars. They also had many forms of chimes, gongs and drums. African chiefs, from the most ancient times, had horns and trumpets made from ivory, wood or even large seashells. All savage races had gongs for war-dances, and drums, such as the skin-covered bowls of the Hottentots.

If we start to study these instruments—indeed, if we look over the thousands of types of instruments man has made from the earliest times to the present—we find they are easier to remember than we might think at first. For musical sounds are produced in only a very few ways. And if we think of the ways in which different instruments make such sounds, it is as simple to sort them out as it is to separate a pile of red and black checkers.

SOUND COMES FROM THROBBING AIR IN DIFFERENT WAYS

First, there are *stringed* instruments. Some of them are plucked, like the harp and the banjo. Some are rubbed with a bow, like the violin. Some are struck with hammers, like the piano. The earliest stringed instruments were plucked; this is the easiest way to make them sound. Later on men began to use bows, and invented the grandfathers and great-grandfathers of our modern violin. But the idea of striking a string with a hammer is quite recent; the piano is not much more than two hundred years old.

Then there are the *wind* instruments. These have been divided into two groups, according to the different ways in which musical sounds are made by them. The instruments in one group are called wood-wind instruments, most of them being made of wood; those in the other, brass instruments.

Then we can divide up the wood-wind instruments still further. Some of them have single pieces of reed which vibrate to produce the musical tones, like the clarinet and the saxophone. Some of them have double reeds, like the oboe and bassoon. And some have no reeds at all, like the flute and all kinds of pipes and whistles. The brass instruments are peculiar: they have no reeds at all, and yet they are very much like the reed instruments. This is because the lips of the players take the place of reeds and vibrate in order to make the musical tones. That is why the brass-instrument player has to be careful that his "lip" is fully under his control. The brass include the trumpets, cornets, trombones, horns and tubas.

Pipes were the earliest of all instruments invented. Here is a youth playing on double pipes.

From a MS. of the thirteenth century.
You see here Reinmar, the Minnesinger, with his instrument, an early form of violin.

The third main group consists of the *percussion* instruments—those which are struck. This includes drums, cymbals, bells, gongs and many others. So, although the instruments used by ancient man to give him music seem very crude and very different from the ones we are familiar with, they were based on exactly these same principles of making musical sounds.

Among the ancient Greeks music was never considered a great art, to compare with poetry or sculpture. In fact, it was first thought of as merely a part of the art of poetry. Wandering minstrels sang to the accompaniment of the lyre. This was a small instrument something like a harp, with a frame shaped like the letter U, and having from four to eighteen strings. In the Greek dramas there was singing and also playing on wind instruments. Of the various wind instruments, the most popular was a flute of cane or bored wood, called the "aulos." The Greeks also had instruments something like our modern oboes, clarinets and bassoons.

But it is with the early Christians that a real beginning was made to the many steps which have led to music of modern times.

Music, of course, started in its simplest form. It started with melody. There can be nothing simpler than a tune all by itself, with no accompaniment, especially if the tune is unadorned and without important rhythm. It was just this sort of music that was used in the Christian church in its earliest days. The choir sang alone and in unison. Then gradually the organ was adopted. But still the music consisted of only the tune; such things as chords and harmonies, which seem to us the most natural things on earth, were unknown to the music-makers of that period.

The developing of music from its simple, formless state was done chiefly by the religious leaders. That, of course, was about the only way for it to develop, for the only music of importance was that of the church. Toward the end of the fourth century Bishop Ambrose adopted from the Greek music four scales, called the *authentic modes*. Later Pope Gregory added four more scales based on the scales of Bishop Ambrose. These have been called the *plagal modes*. Later still, two more authentic and two more plagal modes were added. All church music was restricted to these modes. Although to our ears they sound old-fashioned and queer, yet they were just as much the forerunners of our major and minor scales as the uncomfortable *chug-chugging* "horseless carriages" of twenty-five years ago were the forerunners of the modern automobile. But the old modes had many merits. Often composers to-day make use of modal melodies in their music as a means of helping to create interesting and unusual effects.

This primitive spinet, of about 1440, is a far-back ancestor of our piano. From the Weimar "Wunderbuch."

A CHANGE LEADING AWAY FROM THE SONGS OF BIRDS

About the tenth century a big change occurred: part-singing made its way into music. By "part-singing" is meant singing by several groups of persons at the same time, each group singing a different "part," or tune. There may be only two parts or there may be six or eight. Hymns are usually sung by a choir in four parts. Though the change was very simple at first, it was important, because it was the first step in the separation of the music of man from the songs of the birds. From now on music had a certain quality which man put into it himself that was not just an imitation of nature's. The singing of different notes at the same time—that is man's own development of the music he found in nature.

A lady playing on the clavichord, from a painting by Jan Miense Molenaer, in Amsterdam.

Why did this change come? Probably because people began to have an unconscious longing for something new and richer in music. Singing two different tones at once produced a pleasing effect. Several centuries before, people would have called two tones sung at once harsh and disagreeable. But by the tenth century their musical tastes had developed until they wanted something more than melodies.

We shall see this change going on all the way down to present times. People's ears have steadily become used to more and more complicated music. Sounds that were thought ugly by one generation grew to be considered beautiful by the next. At first two notes at once—which sound very thin to us—were the limit. Then three. Then four and five. Later on, harsh combinations of sounds were thought agreeable, but only if followed by other combinations of sounds which were soothing. People wanted harshness sprinkled through their music very carefully, like a sprinkling of pepper in one's food. But nowadays almost anything in the way of discord is considered "within the rules" of good music. Some of it is all pepper.

Part-singing had developed not only in the church, but in the daily life of the people as well. To satisfy the thirst for music of the nobles and common people alike, traveling singers wandered from place to place. In France there were the troubadours, in Germany the minnesingers and meistersingers. In England, too, there was part-singing. An interesting example of it is a song for six men's voices, dating back to about 1200, called "Sumer is icumen in." It is what is known as a "round," like the familiar tune Three Blind Mice. One voice starts the melody and a second voice follows a few notes behind with the same melody, and then each voice that enters imitates the one before. Another name for this form of music is *canon*. The word "canon" means "rule," and it is a very strict rule that a canon must follow!

While such pieces were becoming popular, composers began to do even more with music. They started writing two or more tunes to be sung at the same time. Have you ever heard Way Down upon the Suwanee River and the Humor-

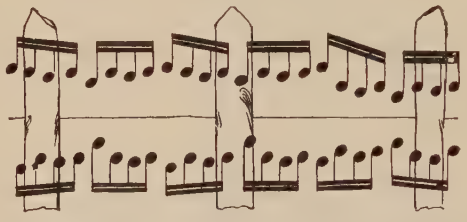
esque by Dvorák played together? They sound well even though they are entirely different melodies. That is just the kind of music people started to write away back in the fifteenth century. It is called *counterpoint.*

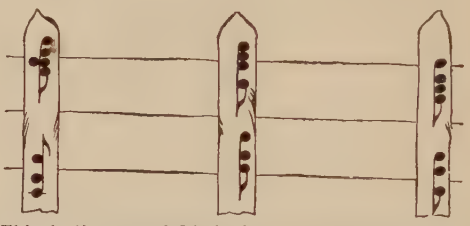
Let us stand off for a moment and look at music to find out what counterpoint really is. There are two ways to look at music. One is to think of it as standing still and made up of different kinds of chords. The other is to think of it as moving, with tunes running along one above the other. The first is thinking of *harmony,* the second of *counterpoint.*

Imagine that music is like a fence made of wooden posts with three or four wires running along it. We expect a fence to be dull and uninteresting, but not music. For music is a fence with different-sized posts, some long and slender, others short, thick and crooked; while the wires run in graceful curves, sometimes far apart, sometimes near together. If we think of the shape of the posts and the places to which we nail the wires, that is like thinking of chords and harmony. But if we think of the curves of the wires and their relations to each other, then we are thinking of counterpoint.

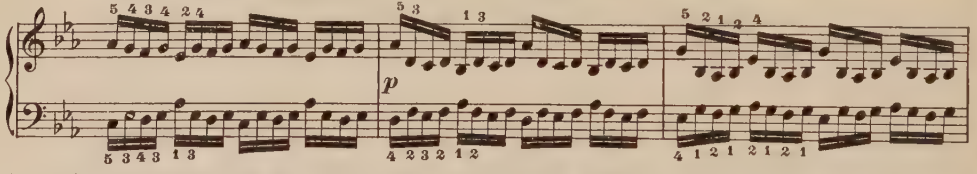
The three illustrations below will help to make this idea easy to understand. The first row gives a fanciful arrangement showing two kinds of musical fence. Below these a few measures from a prelude in Bach's Well-Tempered Clavichord are an example of counterpoint. At the foot of the page a section of one of Schumann's compositions, Symphonic Studies, illustrates harmony.

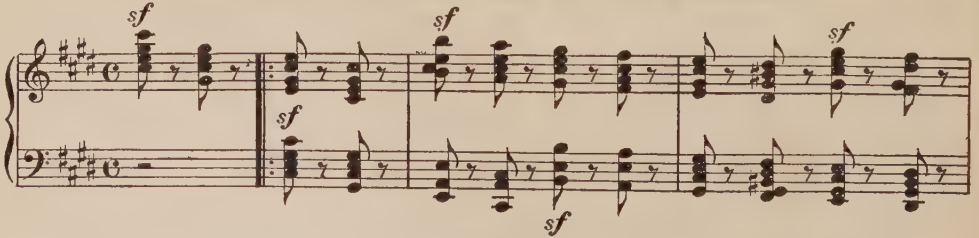
One very interesting thing is that almost never do we find harmony without some counterpoint mixed in—or counterpoint without some harmony mixed in. For instance, although the Bach prelude below is chiefly counterpoint, the notes of the two melodies form the notes of repeated chords, which make harmony. And although the Schumann piece looks like harmony without any counterpoint, the chords in the left hand imitate those in the right hand. This makes a *canon,* which is really a kind of counterpoint, as you can see.

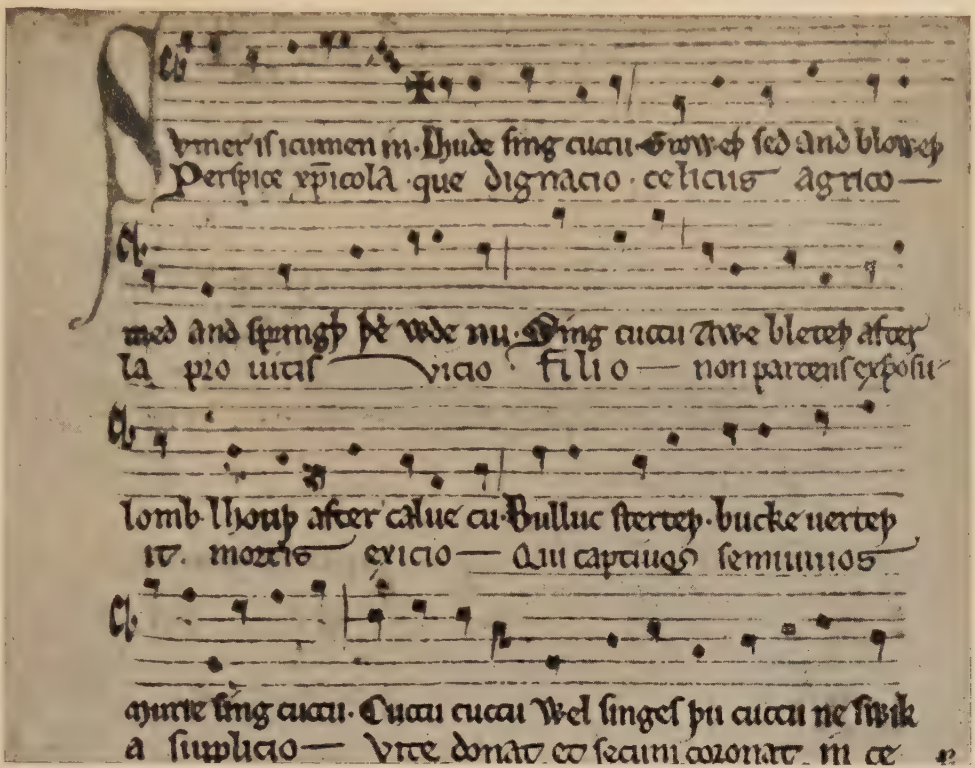
MUSIC, A FENCE OF POSTS AND WIRES

Here is one kind of musical fence, where the wires are notes running along—two tunes at the same time. This is counterpoint.



This is the second kind of fence, where the posts themselves are big chords in which all the notes sound together. This is harmony.



These few measures from a prelude in Bach's Well-Tempered Clavichord show the two melodies running across the page to be played at the same time—a bit of counterpoint.

In these measures taken from one of Schumann's Symphonic Studies you find the notes standing one above another so as to form chords—a good example of harmony.



Here you see a facsimile of part of the manuscript of "the most remarkable ancient musical composition in existence"—the old canon, or round, Sumer is icumen in. The manuscript, made by an English monk in 1240, is in the British Museum. Some of the words, in modern English, are given on page 3497.

PALESTRINA THE FIRST GREAT NAME IN MUSICAL HISTORY

Greatest of the masters of counterpoint in the old church style was Palestrina. He is the first towering figure in the history of music. His name was really Giovanni Pierluigi, but he was called Palestrina after the town where he was born. Although the works of Palestrina sound uninteresting and queer to our ears until we know them well, they are really great and wonderful compositions. His most important music he wrote for church services; this was simple but very noble. It was written in "modal" harmony, not in the major and minor keys familiar to us. And whenever we hear it, we notice that it lacks any strong rhythm, such as we find in music to-day.

After Palestrina's death, composers began to change the kind of music they wrote. More and more they abandoned the contrapuntal style in their compositions—the weaving and winding about of different melodies. In place of that, they turned to simpler music, based on harmony.

One important new branch of music was started at this time—opera. In 1600, a group of musicians in Florence, Italy, decided to write musical plays in the style of the ancient Greek dramas. Their first attempt, Peri's "Euridice," was simple and crude, but it was the beginning that has led to the marvelous operas of to-day. Soon this new form of entertainment became popular. One of the famous opera writers in that century was Monteverde. Usually opera orchestras were small and badly chosen, but Monteverde paid great attention to the orchestras that played his operas. He employed harpsichords, viols, guitars and wind instruments. He also originated new methods of playing; under him the viols first used the device of plucking their strings, instead of scraping them with their bows.

But not until the next century did there come any extraordinarily great musical genius. Then Bach, father of our modern music, wrote compositions unlike anything heard before.

THE NEXT STORY OF THE FINE ARTS IS ON PAGE 7071.

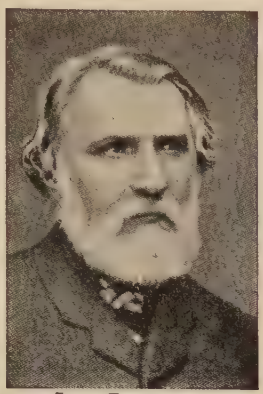
THE SUPREME FIGURE OF RUSSIAN LITERATURE

THE CHATEAU OF YASNAYA POLYANA, THE HOME OF COUNT TOLSTOY

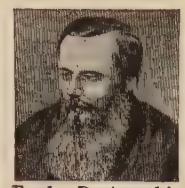
TOLSTOY AT WORK IN HIS BARELY FURNISHED STUDY

TOLSTOY TAKES A WALK WITH HIS SISTER, THE ABBESS OF A CONVENT

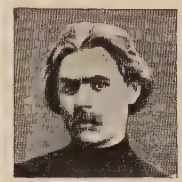
Nicholas Nekrasov.


Ivan Turgenev.

Alexander Pushkin.


Feodor Dostoevski.

Nicholas Gogol.


Maxim Gorki.

THE LITERATURE OF RUSSIA

CONTINUED FROM 6719

RUSSIAN literature, which now occupies a distinctive and considerable position in the world's literature, is of quite modern origin. Russian books that will be permanently read outside of Russia date back, at the farthest, for two hundred years, and nearly all of them were written in the nineteenth century. It was not till the Napoleonic Wars were over that Russia had a Russian history of herself which helped her to realize her own place in the world, or that she produced a national poet who expressed her character and aspirations in her own tongue, discarding imitations of the poets of the nations that had an older civilization.

But almost as striking as the lateness of her beginning with a literature of her own is the rapidity with which it arrested the attention of the world. Nicholas Karamzin published in 1816 the first eight volumes of his History of the Russian State. Alexander Pushkin, the first truly national Russian poet, who found inspiration in Karamzin's History, died in 1837; and forty years later there had been written all the novels by Gogol, Turgenev, Tolstoy, and Dostoevski that have carried Russian fiction over the civilized world. Seed late sown brought an abundant harvest.

Of course Russia had a far earlier primitive literature made and sung, or told, by the people before it was written down, somewhat like the Norse sagas. It consisted of legendary poems or tales, collectively called *byliny,* or "tales of old time," as the word may be translated. The subjects were the legendary heroes of the race, and these orally circulated stories formed groups or cycles that referred to each of the regions which had in succession been prominent in the country's earlier history. Vladimir, Prince of Kiev, was a central figure, and Novgorod, Moscow and the Cossack country each had its share of legendary lore casually transmitted through popular memory. A group of such tales, chiefly of peasant origin, had had time to form around even the character and doings of Peter the Great, who died in 1725.

Besides the *byliny,* or legendary poems, the Russians have large collections of *skazki,* or folk-tales, which are full of valuable material.

Two twelfth-century Chronicles have been preserved—The Chronicle of Kiev, the city round which the earliest Russia formed itself, and The Story of the Raid of Prince Igor, a later twelfth-century prince of Novgorod. These Chronicles, written in a kind of

singing prose, have features which are expanded in modern Russian literature, such as using nature as a background for a story. The Raid of Prince Igor is especially interesting for the light it throws on early Russian history and language. For the most part these compilations were written by monks and remind us of the Anglo-Saxon Chronicle—dry details alternating with here and there a picturesque incident.

We have in early Russian literature also many lives of the Saints and the Fathers. Some of these have been edited by Count Bezborodko in his Memorials of Ancient Russian Literature. It must be remembered that at this time Russia was cut off from the west and south of Europe by her position far inland, and knew little of such culture as they had. Her isolation was increased by her religion: she belonged to the Greek Church, with Constantinople as its centre. Indeed, it was not till the second half of the seventeenth century, in the reign of the father of Peter the Great, that the literatures of the West began to percolate to Russia and give her writers new models for their writings.

THE MAN WHO STANDS AT THE PARTING OF THE WAYS

Moscow had now become the centre of Russian life, but Kiev was more closely in touch with Western learning, and to Moscow from Kiev came Simeon Polotsky, who acted as tutor to Peter the Great's half-brother, Tsar Feodor, and introduced the writing of verse in Russian. He it was who wrote the first Russian play, The Prodigal Son. Polotsky marks the dividing line between primitive Russia and the Russia which began to know and imitate Western Europe. His life was contemporary with that of John Milton.

Russian literature of the eighteenth century expressed the influence of German, French and English literature on the minds of Russian authors before they began to build up a literature of their own, distinctive in style, subject and temperament. The strongest influence in introducing German thought was Michael Lomonosov, a son of an Archangel fisherman. As a lad Lomonosov became absorbed in a love of learning. At seventeen he made his way to Moscow, became conspicuous as a student, passed on to St. Petersburg, and then studied in Germany. Returning to Russia, he founded the University of Moscow, and finally became rector of the University of St. Petersburg.

THE SCIENTIST WHOSE WRITINGS HELPED TO DEVELOP THE RUSSIAN LANGUAGE

Lomonosov's chief interest was in science, but he had a very wide intellectual range, and through his writings, which included verse, he helped to develop the Russian tongue, which he said combined the vivacity of French with the strength of German, the softness of Italian and the conciseness of Greek and Latin. He was an indefatigable writer of verse and prose, and has left odes, tragedies, essays and fragments of epics.

The influence of French literature became predominant in Russia during the reign of the Empress Catherine II, sometimes called "the Great." That strong-minded German usurper made French the predominant language of her court until Russian enthusiasm for France was chilled by the excesses of the French Revolution. The characteristic Russian writer of the period was the poet Gabriel Derzhavin, who was born in 1743 and died in 1816. Though he had a fine mastery of his native language, he cannot be ranked as a truly national poet, for his resounding style was influenced from abroad. He was an admirer of the Gaelic forgery Ossian. There is something lofty and organ-like in his high-sounding verse. His style is perfect, and he had the courage to write satirically of many persons of high rank. The best-known of his poems to Western Europe is his Ode to God. Other celebrated works are: Felitza, Odes on the Death of Prince Mestcherski, The Nobleman, and The Taking of Warsaw.

Though Catherine acted as a patron of French writers, such as Diderot and Voltaire, who laid the intellectual foundations of revolution, she sternly repressed freedom of the press in her own country. An instance is seen in the case of an unfortunate official, Alexander Radistchev, who was indiscreet enough to write a book on A Journey to St. Petersburg and Moscow, describing the pitiable condition of the Russian peasantry, or serfs. The descriptions were perfectly true, but Radistchev was sentenced to death for writing what would now be regarded as a humane and public-spirited appeal. He was banished to Siberia, kept there till his health was undermined, and eventually brought back. He committed suicide when threatened

with a dreaded renewal of exile. An equally sad fate befell the spirited writer Nicholas Novikov, who, after having worked hard as a journalist and done much for education in Russia, fell under the suspicion of the Government and was imprisoned by Catherine. On her death he was released.

KARAMZIN AND HIS UNFINISHED HISTORY OF THE RUSSIAN EMPIRE

Not till Alexander I succeeded to the Russian tsardom in 1801 did Russia begin to live an independent literary life. The man whose writings mark the beginning of the change is Nicholas Karamzin. His father was an officer of Tartar race. The boy was educated at Moscow and St. Petersburg. After he had done some literary work he traveled in Germany, France, Switzerland and England. Returning to edit a Moscow journal, he published Letters of a Russian Traveler, and also a number of translations into Russian from languages ancient and modern. Finally he settled down to write the book that Russia needed most of all, a History of the Russian Empire. He read his volumes to the tsar as he wrote them. Eight volumes were published in 1816, and three more, bringing the history up to 1613, were finished when the writer died, in 1826.

As a historian Karamzin was a defender of whatever he found done by authority in Russia's past, whether it was tyrannical or not. His aim was to arouse in Russians the sense of nationality. His success was great from the point of view of a conservative patriotism. Russia became conscious of herself and articulate. She began to speak to the world through a literature that was her natural expression, and not an echo of French, German or English writing. Karamzin's success was due partly to the glow and pride of his patriotic writing, but it was due equally to the fact that his prose style was plain and simple and clear, like ordinary speech. Lomonosov and Karamzin are the founders of a Russian prose style.

THE CLEVER FABLES OF KRYLOV THAT EVERYBODY LIKED

Among the Russian writers of the nineteenth century who must be named, besides the half dozen that are more commonly known, is Ivan Krylov (1768–1844), who gained fame as a poet first by translating La Fontaine's fables, and then by writing fables of his own invention —simple, humorous, dramatic—appealing to all classes and all ages. Russia has no more popular poet.

Literature was now growing directly out of Russian life. One instance is that of perhaps the most famous comedy, or satire, that holds the Russian stage. When Alexander I died, in 1825, an unsuccessful rising took place, as a result of which five conspirators were hanged.

The state of society in Moscow at this time was satirized in most pungent style by a young foreign-office official in a play called The Misfortune of Being Too Clever. The author, Alexander Griboyedov (1759–1829), writer of a play which has now been popular for more than ninety years, had a strange end. He was sent as Russian ambassador to the Persian capital Teheran. In the embassy there some Russian subjects, Georgians and Armenians, took refuge, but the Persian populace was incensed against them, and, storming the building, killed the ambassador, who was shielding them.

THE MAN WHO TRANSLATED THE ENGLISH POETS FOR THE RUSSIAN PEOPLE

A poet who broadened the Russian idea of poetry, by showing that the poetry of the West has not been exhausted in France, was Basil Zhukovski (1783–1852), who was first reader to the Empress and afterward tutor to the children of the Russian royal family. In 1802 he published a translation of Gray's Elegy, and followed it with translations from Byron, Moore and Southey, as well as Goethe, Schiller and other German poets. Late in life he translated the Odyssey. Zhukovski was remarkably successful in preserving in his translations the poetic quality of the original verse.

The new start of genuine Russian literature was most clearly made by Alexander Pushkin, though it is perfectly easy to trace the sources of his inspiration to foreign writers. Still, his subjects were essentially Russian, and his fine use of his own language and his poetical genius enabled him to Russianize thoroughly any foreign suggestion. Pushkin is generally accepted as the greatest of Russian poets, and he is also a master of prose.

He was born at Moscow in 1799, and was educated near St. Petersburg, where he attracted attention by his poetry when he was a schoolboy. At first he wrote in French, but soon discarded it for his own language. Having become mixed up in

dangerous politics after he had become a foreign-office official, he was sent to the south of Russia on duty, and his poetical impulse was stimulated by the scenery and romance of the Caucasus. There he wrote lyrics and tales obviously prompted by Byron. On his return a poem on gipsy life won him wide popularity.

THE EXTRAORDINARY RUSSIAN WHO WAS KILLED BY A DUTCHMAN

Pushkin was now enthralled by Shakespeare, and in imitation of him wrote his chronicle play Boris Godunov. Later, his greatest work, Onegin, took the form of a poem that is a novel. Now it is probably the most quoted literary work in the Russian language, though its rise to fame was not swift. Pushkin, however, had to overcome the taste for bombast derived from Russian imitations of French verse.

His mind was extraordinarily prolific, though it usually worked on a suggestion from other poets, and his output was abundant and varied. Historically he relied on Karamzin's history, and felt strongly the thrill of his ardor. Pushkin was killed, at the age of thirty-seven, in a foolish duel with a Dutchman who had married his wife's sister. He had brought into Russian poetry a note of freshness which has tended to brighten it ever since.

Two other Russian lyrical poets have a sure resting-place in the hearts of the people. Michael Lermontov is believed to have been of Scottish descent, and his name a Russianizing of Learmont. His was a turbulent nature. He became an officer, but because of his quarrelsomeness was sent to the Caucasus, which at that time was frequently in a state of revolt. Here the splendid scenery and romantic surroundings acted as inspirations, and he wrote poems which are known to almost every Russian child. Returning to Moscow, he became a social figure, but his life was wayward, and twice more he was exiled from the society he loved. Finally he met his death, at the age of twenty-six, in a duel in the Caucasus, the land which had called forth his genius. Lermontov wrote a novel, A Hero of Our Time, with himself as its hero, and that work is believed to have been the cause of the quarrel which led to his death. He was one of the poets who felt strongly the influence of Byron, though his own writing was distinctly national in its spirit and expression. He has left us many lovely lyrics.

Alexis Koltsov (1809–42), contemporary with Lermontov, was a true peasant poet. His subject was the life of the rural people, and he sang that in lyrics as natural as those of Robert Burns, and as exquisite. They are to be found in all collections of Russian poetry. As a cattle-dealer he moved about freely and was a part of the life he sang. Even among the illiterate his songs are known.

Other poets of distinction are: Nicholas Nekrasov (1821–77), a grim portrayer of peasant life in a style resembling that of Crabbe, the English realist; and Count Alexis Tolstoy (1817–75), who wrote satires and historical plays, but is best known for melodious love lyrics, nature poems and ballads.

It is not, however, through its poetry that Russian literature has become widely known, but through its prose, and particularly its fiction.

THE CRITICS WHO ARE TOO FOND OF TEARING UP

Other forms of prose writing have been successful, but in a far less degree. Vissarion Belinsky (1811–47) founded a school of criticism which was more vigorous than wise, and Russian criticism has always been lacking in moderation and toleration. It is inclined to tear, rather than to dissect, its subject. Much of it, as, for instance, that of Alexander Herzen (1812–70), was written outside of Russia. Herzen preached communism for many years in London through a newspaper of his own. Michael Saltykov (1826–89) was a savage satirist who found much in Russia to expose bitterly. His work compares with that of Jonathan Swift. His writings have not been translated. This cannot be said of the latest of Russian critics and historical romancists, Dmitri Merezhkovski. His Christ and Antichrist has been translated into many languages, and his interpretation of Russian fiction is well known.

The first great Russian novelist was Nicholas Gogol, who was born in the Cossack country in 1809 and lived till 1852. From his twentieth to his twenty-seventh year he lived in St. Petersburg, first as a government clerk and then as a professor of history.

THE SPLENDID WORKS OF RUSSIA'S FIRST GREAT NOVELIST

But all the time Gogol's heart was away in Little Russia, and he put his remembrances into some sketches, Evenings on

a Farm near Dikanka, which determined his future. Other sketches of Cossack life followed, with a strange mingling of the real and the fantastic, fun and melancholy. He was only twenty-seven when he wrote a comedy which competes for the position of the most popular on the Russian stage, and has been seen with cordial appreciation on the English stage. This is The Inspector-General, a satire on the truckling, flattery, jealousy and corruption of the Russian official world. The play was saved from official censorship by the tsar, who ordered it to be played.

After the successful appearance of his comedy Gogol left Russia and spent the rest of his life abroad, chiefly in Rome. Here he wrote his masterpiece, the novel Dead Souls, an exposure of the serf system then enslaving the Russian peasantry. By his simple sincerity in picturing real life Gogol led Russian fiction away from wordy pomposity. Gogol did not complete Dead Souls. It was planned in three parts, and only the first part and an incomplete section of the second part are published. Possibly the book was not becoming quite what its author meant it to be; as he lived he grew more and more religious and humble, and more and more inclined to advocate patient suffering. In his *Taras Bulba* he gives us a powerful picture of the savage warfare carried on between the Cossacks and the Poles.

How Turgenev introduced the Russian character to Europe

Ivan Turgenev (1819–83), the first Russian novelist to win a large reading public outside of Russia, was born of a good family. Like so many Russian writers, he found his early writings officially frowned on as tending to be dangerous, and he was kept on his family estate for two years. When he was free he left Russia for Germany, and later went to Paris, where he wrote most of his novels of Russian life.

Turgenev introduced Russian character to Europe, but he did not keep quite in touch with the Russia of his own day. He was a poet in essence and his style had a gift of elegance and finish of form which

Count Tolstoy at work in the fields—From the painting by J. E. Repin.

were almost French in character. That form he carried into Russian prose with advantage to it, but he had not so close a grip of Russian life as some brother novelists of equal fame had. The foreign reader feels a strangeness in Russian character as depicted by Gogol, Tolstoy, Dostoevski and Gorki, which borders on the unnatural, and yet is not unnatural in Russia. This strangeness is not felt in the same degree in Turgenev's novels, and they are therefore accepted without hesitation. Perhaps the difference comes from writing from memory away from the actual Russian atmosphere.

Turgenev's first prose writing, Papers of a Sportsman, described the miserable condition of the peasants with startling realism. His Nest of Nobles, a singularly pathetic story, won him wide popularity. It was after the publication in 1862 of his Fathers and Children, a story which did not satisfy extremists on either side in politics, that he left Russia. In it he describes the nihilistic doctrines then beginning to spread in Russia, and according to some writers be invented the word "nihilism." The tale is his masterpiece. Virgin Soil, his later ambitious story, was written when Turgenev had withdrawn from a Russian environment. Besides his longer stories, many shorter ones were produced, some of great beauty and others showing great power of character analysis. These were afterward collected into three volumes. Unquestionably he is one of the great novelists of Europe. He knew the nobles of Russia by birth and contact, and the peasantry by sympathy and observation; but peasant life had never been his own, and his mother never forgave him for doing such an undignified thing as writing so that anybody could criticize. His writings have been made familiar to people who do not know Russian by French translations. There are also many English versions.

Count Leo Tolstoy is far more widely known than any other Russian, because his writings cover an enormous range of human interest. He appeals to different types of people as a novelist with ever varying views, a religious zealot seeking rest, and an economic and social pioneer. In all these manifestations he expresses himself in striking literature, powerful in its simplicity. Unquestionably Tolstoy is a landmark in the world of literature. There has been no one like him. It is doubtful if there could be anyone like him outside of Russia.

Tolstoy was educated by foreign tutors, according to the fashion of the day. As a child, though thoughtful and observant, he showed no marked talent. He was very sensitive and this led him, as he grew older, to hide himself away from his playmates and spend hours in lonely brooding. At the age of fifteen he entered the university of Kazan and gained independence with his student's cap and gown. But he wasted his time and did not study, and finally left without accomplishing much. He returned to his estates, determined to improve the condition of the peasantry, but lacking the necessary patience to deal with deep-rooted misery, he again threw all serious life to the winds. Finally his brother's persuasions led him to enter the army, and he saw service in the Crimean War.

Distinguished for his military writings, he returned to St. Petersburg to become the centre of the literary society of the day.

Already he was writing poetry, tales, sketches, or an autobiography of his youth. Then, after a period of social gaiety, he spent some time in foreign travel, still writing tales. Then came his marriage to Sophia Behrs, and more restful writing, merging into the ambitious composition of his greatest books—War and Peace, and Anna Karenina. The accession of Alexander II in 1855 saw a movement for the freeing of the serfs in Russia. "The People" and "Progress" became the watchwords of the press of Germany and Russia. A new impulse was felt in literature, and all the Russian authors of the day were deeply stirred. Tolstoy was affected most deeply and lastingly of all. Now at last he realized the bent of his mind, and "The People" henceforth form the keynote of his life and writings. His *Polikoushka* is a painful story of the ills of serfdom.

THE NOBLE AIMS OF TOLSTOY THAT ARE REFLECTED IN HIS WORKS

He was now famous throughout the world as a writer, but the problems of religion and life absorbed his thoughts, and he tried to plan a life of perfect goodness and of strict social justice. These aims produced much more literature. Later still he wrote other novels, including the Kreutzer Sonata, and Resurrection. Finally, having failed to rid himself of all

his earthly possessions and to break with the social conditions by which he was surrounded, he died at the age of eighty-two, at a railway station, while on the way to retirement in a monastery.

Tolstoy was a Russian through and through. He pursued whatever object he had in view with a narrow intensity, and whatever object he was pursuing he wrote (as the ordinary Russian talks) a great deal about it, and with great fervor. He had the power of giving his writing, whatever its subject might be, the clearness, simplicity and power of great literature. What he had to say he said choicely if it needed choiceness, powerfully if it needed impressiveness. His literary strength was greatest when he wrote War and Peace, and, judged by that epic tale, he will remain one of the world's supreme novelists. His personality, as shown in all his writings, is a fascinating study.

THE STORMY LIFE OF THE COLOSSUS OF RUSSIAN LITERATURE

Feodor Dostoevski (1821–81) is regarded by many who best understand the Russian character as the greatest Russian novelist of all, but special experience of the Russian temperament is needed to reach that opinion. When his writings are judged in conjunction with his life, however, they become abnormal in their power.

Dostoevski was educated for the army, but adopted literature and showed the direction of his sympathy by writing a story called Poor People. It was recognized by critics as charged deeply with emotion, and it gave its author a favorable start. But Dostoevski, having joined a political-discussion society, was suddenly arrested as a member of a revolutionary organization, imprisoned, sentenced to death, and then, instead of being hanged, sent to exile in Siberia for four years with hard labor, to be followed by service for life as a private soldier. He served his four years and three more as a soldier before he was recalled to Russia.

Such was life in the old Russia.

This experience in Siberia colored all Dostoevski's remaining years. It had broken his health and left him an epileptic, but it filled his heart with infinite compassion and with a great longing for a time when a spirit of mutual kindness should govern the actions of man toward man. He had seen life at its best and worst, and his experiences were told in a book, Buried Alive in Siberia, while his impressions took form in a novel which he called Crime and Punishment. The book moved the heart of Russia.

The novelist had gained by his enforced close contact with his fellow-prisoners, some of them hardened criminals, a great insight into the workings of men's minds. We call this psychology, and seldom has there been a more vivid expression of it than in this novel Crime and Punishment. The hero is a poor student who is led on to commit a murder; he repents, gives himself up and is exiled to Siberia. The book expresses some of the theories of Dostoevski: the idea of purification by suffering, the hope of a Russian state of the future bound together only by the ties of brotherly love; the belief that in every life, no matter how degraded, there is some moment of high self-devotion. Dostoevski hates the use of physical force: he believes everything can be done by moral suasion.

HOW DOSTOEVSKI REVEALED THE TRUE NATIONAL HEART OF RUSSIA

Dostoevski continued writing tales in poverty. The quality of his work was uneven, but he again reached high-water mark in his novel The Idiot. The hero is a simpleton so good and unselfish that he impresses the selfish and the vile, and in his simplicity reads the minds of the cunning.

How greatly the novelist had impressed his countrymen was not realized until his death, in 1881, when enormous crowds attended his funeral and showed a devotion to his memory that has scarcely a parallel in history. Though Dostoevski's writing was hasty and often lacked constructive skill, it had a tenderness, touched with melancholy, which moved to its depths the Russian spirit, and revealed how truly the national heart had been interpreted by a novelist whose life had been overshadowed by pain and strife.

The novel is the greatest glory of Russian literature. There was no real Russian novel before 1840, yet before the century closed the best Russian fiction had already been written.

Though Russian literature began late, and has had to struggle against repression, and against a large measure of national illiteracy, it has given in the last hundred years considerable additions to the books which command attention from the world.

THE NEXT STORY OF LITERATURE IS ON PAGE 7009.

CHIEF MUSICAL COMPOSERS OF THE WORLD

Sir E. Elgar.

Leoncavallo.

Mozart.

Balfe.

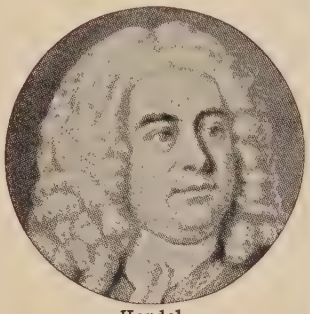
Schumann.

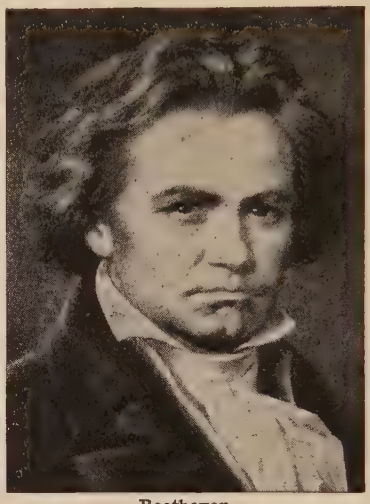
Pietro Mascagni.

Gounod.

Sullivan.

Dr. Strauss.


Handel.


Beethoven.

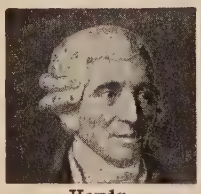
Wagner.

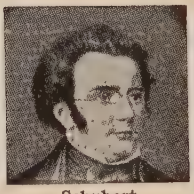
Von Weber.

Rossini.

Palestrina.

Tschaikowsky.


Haydn.


Schubert.

Liszt.

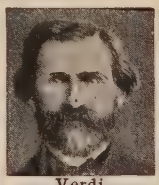
Mendelssohn.

Chopin.

Bizet.

Purcell.

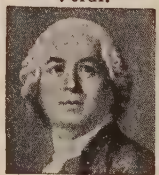
Bach.


Verdi.

Brahms.

Grieg.

Bellini.


Gluck.

Giacomo Puccini.

The boy Handel is discovered playing in the garret in the night.

COMPOSERS OF GREAT MUSIC

CONTINUED FROM 6636

Beethoven.

THAT music was of great consequence in antiquity we know from the Bible. In Assyria, Babylon and Egypt music had a part in the religious and social life. The Israelites were an intensely musical people, and it is thrilling to reflect that, if history does not err, the songs they sang by the waters of Babylon were heard again when they rebuilt Jerusalem, and the strains of those same songs were preserved in the hymns sung in our first Christian churches, and may still linger in the sacred music of our day.

To the Greeks music was a revered influence. Aristotle preserves for us an interesting saying of his age: "To reform or to relax the manners of a people it suffices to add a string to the lyre or to take one from it." But the music of that marvelous age is lost, with most of the literature and painting and much of the sculpture which made Greece the fount of the whole world's inspiration.

Because barbarism darkened the world we know little more about musical composition in the first fourteen centuries after the time of Christ than in the fourteen centuries which went before. So music had to await the Renaissance. Then it emerged as part of the rebirth of knowledge. It was then that three men came who built, on foundations unknown to us, the beginnings of a new edifice of music.

One of the first was Giovanni Pierluigi da Palestrina, son of peasants. He was born out in the country near Rome after 1524. Mastering all that could be taught him of musical methods then in use, this composer reformed music as Cimabue helped to reform painting. When Pope Pius IV decided to bring into use a higher form of music for the church than then existed, Palestrina wrote three masses, of which the third was a masterpiece. "That," said the Pope, "is such melody as St. John heard from the sacred altar when heaven was revealed to him." He decreed that the music of Palestrina should be the model for all future church music, and it was so for two centuries.

At about the same time two great figures appeared in England. The first was Thomas Tallis, "father of English cathedral music," born at Waltham Abbey somewhere about 1515, who became a choir boy in London. Later he held the post of organist at Waltham until the abbey was dissolved. During the greater part of his seventy years he composed music for religious services.

WILLIAM BYRD, WHOSE MUSIC IS NOW REVIVED AND ADMIRED

But Thomas Tallis is of still greater consequence to us because of the fact that he was the instructor of William Byrd, born at Lincoln in 1542 or a year later. At one time organist at Lincoln Cathedral, he was afterward associated with Tallis as honorary organist at the Chapel Royal. In order that he might live, Queen Elizabeth gave him and Tallis the sole right to print and publish music in England. Since they lost money on that, they were each given land and contrived to survive.

Byrd composed all sorts of music with ease and ecstasy—music for the organ, for orchestra and for the voice.

> Since singing is so good a thing,
> I wish all men would learn to sing,

he wrote, and he did what he could to make them sing by furnishing them with good music. He died in 1623, leaving his country a glorious heritage. But he and his work were forgotten, as completely as Shakespeare was forgotten, for a century. Only in these later times is his work being lovingly sought out and published. The results show him to be greatest of all the old English composers.

HANDEL SET MUCH OF THE BIBLE TO MUSIC

England counts as an adopted son the German composer Handel, who was born at a little town called Halle in 1685. His father had made up his mind that his son should be brought up in the profession of law. But music was in the boy's blood, and nothing would check his ambition to be a composer. With the help of a friend a clavichord was smuggled into the attic where George slept. This instrument—a forerunner of the piano—could not be heard through the closed door, so at night, when all the others were in bed, he played and played until he mastered the instrument. His father, soon realizing that it was no use to keep him from his desire, procured good teachers, and at the age of twelve the lad went to Berlin to study. While he was still young, in the orchestra of the Hamburg Opera House Handel became well known for his playing on the harpsichord; and it was in Hamburg that his first opera was produced.

After studying and composing in Italy for several years the musician accepted the position of director of music in the household of the Elector of Hanover, but only on condition that he might have a leave of absence to visit England. Once in England, however, he settled there, practically making it his home for the rest of his life. When in 1714 the Elector of Hanover, whom Handel had thus deserted, became George I of England, the composer did not dare to meet him until a pardon had been secured.

For years Handel wrote little but operas. Generally he rented a theatre for his own use, and though he had some successes, he had more failures. In fact, he was twice bankrupt through his opera business. One cause of trouble was his uncertain temper and lack of tact. In his earlier days a large button on his coat had saved the musician's life in a duel. As a conductor he had many disagreements and disputes with his singers; and one rivalry with an Italian composer became so familiar to the public that it was recorded in a teasing bit of humorous verse:

> Some say, compared to Buononcini
> That Mynheer Handel's but a ninny;
> Others aver that he to Handel
> Is scarcely fit to hold a candle.
> Strange all this difference should be
> 'Twixt tweedle-dum and tweedle-dee.

If Handel had been more successful with his operas we should never have had the grand oratorios for which his name is most famous now: he turned to oratorio when he had exhausted himself with opera. An oratorio is a long sacred composition for voices, the words nearly always taken from the Bible.

Somebody has said of Handel that he set the Bible to music, and he very nearly did. Besides other works, he wrote more than twenty oratorios, though only a few of them are performed to-day. One alone of them all would have been quite enough to immortalize the name of Handel, for it is to Handel that we owe The Messiah, heard all over the world every Christmas, and first performed in 1742. Just as we think of Paradise Lost when we think of Milton, or of Robinson Crusoe when we think of Defoe, so it is The Messiah that comes to mind when we think of Handel.

The composer was blind for several years before he died, but he continued to direct the performance of his works as long as he lived. A naturalized Englishman, he was given great honor in

THOMAS TALLIS LISTENS TO WILLIAM BYRD

"Since singing is so good a thing, I wish all men would learn to sing," said good William Byrd. Here we see him practicing on his virginal, to the delight of his famous master, Thomas Tallis.

his adopted country, and at his death, in 1759, was buried in Westminster Abbey.

HANDEL AND BACH, WHOSE MAGNIFICENT MUSIC WILL LIVE FOREVER

The greatest musician living in Handel's time was Johann Sebastian Bach. The two, Handel and Bach, are often spoken of as if they were a sort of Siamese twins of music. They were both Germans who were born within a month of each other. Both were fine organists; both gave great religious works to the musical world; and both were stricken blind in their later years. Beyond that they did not have much in common. Handel never married; Bach, a quiet stay-at-home man, was happily married twice and had a family of twenty sons and daughters. Among them, with their pupils, they could make up an orchestra. Three of the sons, Wilhelm Friedemann, Karl Philipp Emanuel and Johann Christian, were musicians of ability and composers of talent and importance.

The great Bach's organ compositions are the most perfect things of the kind ever produced. One writer says they are "unsurpassed and unsurpassable." Bach is to music what Shakespeare is to literature, and just as it is the ambition of every actor to play Shakespeare, so it is the ambition of every organist to play Bach's great fugues.

Bach lived in the time of Frederick the Great. Now, Frederick was musical; he played the flute very well, and he took a notion to have a visit from Bach. So Bach, who was then over sixty, set out on the journey. The king was at supper when his arrival was announced. Springing from the table, Frederick broke up the meal with the words, "Gentlemen, old Bach is here!" and he took Bach, weary as he was with travel, through the palace. Bach played upon the piano, which was then a new invention, and improvised upon a theme given him by Frederick. Then, at the end, he told Frederick that he preferred the organ. As a happy souvenir of his visit the master wrote a series of compositions built around the king's theme.

THE GRAND OLD MAN OF THE ORGAN WHOSE INFLUENCE LIVES TO-DAY

Bach made his preference for the organ so clear that we think of him mainly as the grand old man of that noble instrument. Nevertheless, what is called his Passion Music is so fine that singing societies have been formed for the express purpose of singing it, while every boy or girl who hopes to be a true musician spends a great deal of time in studying at the piano the work that Bach wrote for the well-tempered clavichord. Bach has had a great and lasting influence on all the great composers who have followed. This wonderful genius died in 1750, nine years before Handel, who mourned for him as for a brother.

In the world of opera at this time there appeared a reformer who, after writing a number of operas in the style that was familiar, produced some great dramatic works of a new sort that roused up hosts of enemies to fight for the old forms.

The German composer who stirred up such a strife was Christoph Wilibald Gluck, who lived from 1714 to 1787. The son of a forester to Prince Eugene of Savoy, he was born at Weidenwang. After learning to sing and to play on the violin, the cello and the organ, the young man studied further in Prague, Vienna and Italy. In Prague he heard some of the country tunes that later found a place in his compositions. In Italy his first operas were produced.

A few years were spent in London before Gluck settled in Vienna, in 1748, and made it his real home. There he was married and became conductor of the opera, producing a number of operatic works of his own.

His "reform" operas were not begun before the year 1760, and were all written during the twenty years that followed. And what was the nature of the reform? It was a movement to put aside elaborate musical forms that had no part in expressing the words or making clearer the meaning of a dramatic situation, but were intended only to show the beauty or "nimbleness" of a voice. A long-held note, an extended run or cadenza might interrupt any part of a scene, just so that the skill and training of the singer might be displayed.

Calzabigi, who wrote words of real value for operas, joined with Gluck in the effort to change this foolish fashion and make words and music work together to convey the idea in a drama.

Orpheus and Eurydice was the name of the first great opera produced with this aim. It and some of those that followed are still famous, especially two that were

first given in Paris—Iphigenia in Aulis and Iphigenia in Tauris. The earlier of these two opened the contest between the new kind of opera and the old accepted type. Gluck fought impetuously on his side, and in the end his superior work left his opponents in a position of defeat. Ill-health forced him to spend his last seven years quietly in Vienna.

Bach and Handel, though they were both Germans, born in the same year, never met. It was not so with another pair, Mozart and Haydn. They met often, and were very fond of each other. Haydn described Mozart as "the most extraordinary, original and comprehensive musical genius ever known in this or any other nation."

We shall deal with Josef Haydn first. He was the father of most of the instrumental forms of music which are now regarded as fixed forms—the symphony the sonata, the string quartet, and the like.

THE POOR PEASANT BOY WHO BECAME THE FATHER OF MODERN MUSIC

As a boy he had to go out into the world to earn his own living at an age when a boy of to-day would be at school. The parents of this great composer were humble Austrian peasants, of the Croatian race, and they were living in a little house on the market place at Rohrau when he was born, in 1732.

His musical abilities, discovered in early childhood, were not thwarted. The father arranged for the training of his young prodigy, and the young prodigy was taught his notes with many floggings when things went wrong. The boy had a good voice and was sent to sing in the choir of the Vienna Cathedral. But the day came when his voice "broke," and for the time he was of no more use there. The choirmaster might have kept him resting until his voice "set," but Haydn had displeased him. One day, as a boyish prank, he had cut off the pigtail (or queue) of a fellow-singer. Now he was dismissed from the choir and left to provide for himself as best he could. You would not like to hear of all the hardships he endured for a long time after this. He became servant to a great music teacher; he played the violin at dances and even in the streets! At last friends lent him a small sum of money and helped him to secure a number of music pupils.

THE HAPPY DAYS OF HAYDN'S LIFE, AND HOW HE WROTE HIS BEST MUSIC

But he was perfecting himself in composition all the time; and the Countess of Thun admired his sonatas so much that she found for him a remunerative engagement, and introduced him to pupils who paid well. Henceforward he had no trouble in getting on. In 1770 he married, not very happily, and a year later he entered the service of the Esterhazys, one of the richest Austrian families of the time. Great families had their own private companies of musicians in those days, and Haydn was the Esterhazys' Kapellmeister, or head of their musical household. In this post he had a good salary and a comfortable home, and he went on with his composition under the most favorable conditions.

That was until 1790, when the Esterhazy orchestra was disbanded. Then he went to London on a visit and wrote for certain London concerts some of those symphonies which we still delight to hear. Mozart saw him just before he left, and wept at the parting. "We shall never meet again," he said, and it proved true.

Haydn's symphonies are still played; his piano music is on many programmes, and his oratorio The Creation, of which we have spoken, makes the third in a great trio with Handel's Messiah and Mendelssohn's Elijah, of which we shall speak presently. Haydn wrote The Creation in his old age, and it was at a performance of the oratorio in 1808 that he made his last appearance in public. The excitement was too much for him. Pointing upward, he cried: "It came from thence!" They carried him out, and as he was passing, Beethoven, who was present, bent down and fervently kissed his hand and forehead. The next year "Papa" Haydn died.

THE WONDER OF MOZART'S GENIUS, AND HOW HE COMPOSED MUSIC AT FIVE

Mozart as a very little boy began the double career of performer and composer, and at once became distinguished. A young man once asked Mozart to tell him how to compose. The gentle Wolfgang Amadeus, for these were his Christian names, made answer that the questioner was too young to be thinking of such a serious occupation. "But you were much younger when you began," said the aspirant. "Ah, yes, that is true,"

replied Mozart, with a smile, "but then, you see, I did not ask anybody how to compose."

Mozart was born in the city of Salzburg in 1756, and was only five when he composed a minuet and a trio. His father was a good musician, specially expert as a violinist, and Wolfgang had a sister, Maria Anna, who at first showed nearly as much talent as he did. Hence they all—the father and the two children—started on a musical tour, in the course of which Mozart played before the Empress Maria Theresa, and romped with the little princess who afterward became queen of France—the unfortunate Marie Antoinette. These great ladies used to take the little genius on their knees and kiss him and shower gold upon him. All the royalties in England made a darling and pet of him.

How Mozart became poor and danced to keep warm

It was the most care-free time in Mozart's short career, for from the day that he began life in earnest as a married man—that was in 1782—the wolf of poverty never left his door. He composed incessantly, but even successful composition did not pay then as it does now, and the butcher and the baker often worried poor Mozart for a settlement of their accounts. A friend who called one winter day found Mozart and his wife waltzing round the room. "We are cold," they said, "and we have no wood to make a fire." Their love for each other helped them through many a discomfort and hardship, for life brought a series of struggles with intrigue and financial trouble. Let us think of the glorious works that Mozart produced under such depressing conditions. He left 769 compositions in all, and he was only thirty-five when he died.

In his own day he was regarded chiefly as a composer of opera, and we still think very highly of Don Giovanni, The Magic Flute, and The Marriage of Figaro. He wrote forty-nine symphonies, and conductors still place some of them on their programmes, particularly the so-called Jupiter Symphony and one in G minor, which has been described as his "tenderest and daintiest instrumental composition." Mozart also wrote sublime church music, including masses, vespers, litanies, cantatas and oratorios. Music-critics call parts of his Requiem perfect.

The stormy day when Mozart was laid in an unknown grave

Mozart's end was very sad. He was taken ill in 1791. During his illness he worked hard on the Requiem (a sort of funeral song) which he had begun. He did not live to finish it, but sketched the uncompleted parts. While he was on his deathbed he had it sung by some friends, that he might hear its effect. On his funeral day a great storm arose, and only the undertaker and his men went to the cemetery to see the rare musician buried. He died so poor that his remains had to be put into a pauper's grave. This was a disgrace to the whole nation and its ruler. Nobody looked for the grave for many years, and when a search was made nobody could point it out. So Mozart's monument in that great Vienna cemetery stands over an empty grave.

When Haydn was dying in Vienna, in 1809, the French were bombarding the town. Haydn's servants were terrified, but the dying composer took it all very calmly. He asked to be lifted from his bed to the piano, and when he was seated he played his own Austrian Hymn three times over, while the guns were thundering outside.

The mighty Beethoven who was too deaf to hear his own music

At that very moment another composer in Vienna was crouching in a cellar, with cotton stuffed in his ears. That was the mighty Beethoven. His hearing had begun to go, and he was afraid that the sound of the explosions would still further endanger it. In time he became almost totally deaf. The affliction embittered all his later years and turned an originally lovable man into a kind of surly bear. Beethoven, like Handel, did not marry. He would throw the soup in his housekeeper's eyes when it did not please him, and stamp and rage and growl over the most trivial annoyances.

We must not think harshly of him, however, for Beethoven, apart from his deafness, had a very hard life. Born in 1770 at Bonn, the pretty little university town on the Rhine, where they have preserved his birthplace, he had to work his way up in a home directed by a drunken father. The father, who was musical, had heard about the triumphs of the Mozart children and thought that he would make money out of his own

Mozart, seen here with his father and sister, was one of the most remarkable of musical geniuses. When only five he composed music, and at seven could play difficult works without a mistake.

The world has never produced another master of the organ like Bach. When he played, the instrument seemed to speak. We owe our system of piano-playing with all the fingers to Bach.

Mozart's later years were very sad. He had made little money and had spent it all, and was constantly in debt. His health, too, was bad, and jealous enemies persecuted him. At last these things brought on an illness from which it was evident he could not recover, and summoning a few friends to his bedside, he asked them to let him hear the magnificent Requiem he had been composing. This they did.

The bottom picture on this page is reproduced from the painting by Kaulbach, by permission of the Berlin Photographic Company.

Ludwig. So he set him to work at the piano, and visitors would often see the child late at night shedding tears over the keyboard. When he was about seventeen the boy went to Vienna, where, it is said, Mozart gave him some lessons in composition. When Mozart first heard him play he exclaimed: "Pay attention to this youngster, for he will yet make a noise in the world." A few years later the young man went again to Vienna to study, and made his home in that city for the rest of his life.

Beethoven's works for the piano, particularly his sonatas, are the grandest things of their kind ever written. All the great pianists regard this man as the king of composers for their instrument; and in the orchestral field, take away Beethoven's nine symphonies—the "immortal nine" they are sometimes called—and we should take away the backbone from the orchestra. He did not write very much for the voice, but he left one beautiful song, Adelaide, and one opera, Fidelio. He passed away in March, 1827, and Vienna never before had seen such a funeral as his, the crowds being so immense that the soldiers had to be called out to clear a passage for the procession.

A SHORT LIFE THAT WAS "PRECIOUS TO THE WORLD"

A year before the death of Beethoven the ranks of German music-composers had lost another whose life, though not long, had been, as someone has said, "precious to the world." Karl Maria von Weber (1786–1826) was the founder of the romantic school of German opera. His work of his best period struck a truly national note, and his influence was echoed clearly in the measures of some of Wagner's most familiar operas.

Born of a family that had long been devoted to the arts, Karl von Weber had the misfortune of being son to a weak member of that family—a shiftless musician who hoped that his boy would show himself a prodigy and, like young Mozart, bring his father gain. The boy was trained to sing and to play upon the piano, but his general education was uncertain and incomplete. It was an early indication of his great force of character that he somehow got for himself the necessary education of a gentleman. The same fine spirit carried him through the hardships of life and left him victor, in spite of ill-health and many other misfortunes.

In his forty years he wrote more than 250 compositions of different sorts—symphonies and masses, songs and pieces for piano and orchestra, besides operas. The score of his first opera, written before he was fourteen, and other early works were burned by accident. Opera called to him first because of his intimate knowledge of the stage in his father's traveling troupe.

THE MAN WHO BORE DISGRACE TO SAVE HIS FATHER

Weber's first position of importance was at Breslau. Thence he went to become private secretary to the Duke of Württemberg. But just as he was about to have an opera produced at the court theatre he was banished in disgrace, although guiltless. To shield his father, who had appropriated some funds left in Weber's care, the young musician assumed the blame and left the court.

In 1813 began his task of controlling and reforming the music in the theatre at Prague—a work in which he succeeded so well that in 1816 he was given the same task at Dresden. Holding firmly against the jealousies of rivals and critics, especially those who favored Italian opera, Weber did a great service for German opera, and when his own first great opera, Der Freischütz, was performed in Berlin in 1821, it was given a rarely triumphant reception.

This was followed by Euryanthe, and this, in turn, by Oberon, which was composed during a desperate struggle with failing health, to make provision for the dying composer's family. Oberon, written for an English patron, was produced in London in April, 1826. Barely two months later Weber died. His later years had been made happier by the devotion of a good wife, who had given up her own successes as a singer to be his companion and helper.

There was another great composer who went through very much the same sufferings, the same persecutions and fate as Mozart. His name was Franz Schubert, and he was born in 1797. "My music is the product of my genius and my misery," Schubert said. His people were poor, and he had eighteen brothers and sisters. Schubert's father was a schoolmaster, and probably gave his son his early education. He also taught

young Franz to play the violin, and an older brother taught him to play the piano. Franz soon got beyond the knowledge possessed by his home teachers and by the choirmaster of the parish church. However, he gained admission to the choir of the emperor's chapel, where he was well taught and quickly outdistanced his companions. Before he left the school, when he was about seventeen, he had written a symphony.

He began to compose at eleven, and he consumed enough music-paper to have made a small fortune for a stationer. Although he wrote overtures, symphonies, quartets, operettas, church music and piano music, now we remember him chiefly by his songs and a few orchestral pieces.

GERMANY'S GREATEST SONG-WRITER, AND HOW HE COMPOSED A FAMOUS SONG

He is to the student of singing almost what Bach is to the student of the piano. The story of how he wrote some of his songs is of great interest. His lovely song Hark, Hark, the Lark was written one Sunday afternoon while out on a walking expedition. He and his friends sat down to rest in a summer garden, and while waiting for refreshments he picked up a volume of Shakespeare which lay on the table. The book opened at the song. The words started a flow of melody in Schubert's brain and he wrote the precious measures on the back of a bill-of-fare.

One afternoon Schubert took up a volume of Goethe's works lying on his table. He read The Erl King. The rushing sound of the wind and the terrors of the enchanted forest were instantly changed for him into realities. Every line seemed to sound in strange, unearthly music as he read, and seizing a pen, Schubert dashed down the song nearly as we know it. He got a great singer to sing it; then a Vienna music publisher, who had up to that time declined to have anything to do with his songs, asked to have it. He paid Schubert a very small sum, though in a few months the publisher made four hundred dollars out of it. That was Schubert's frequent experience. Some of his finest songs were sold for the price of a meal. Grinding poverty, slights, disappointments were his portion. He died in 1828, before he was quite thirty-two. This is the inscription on his tombstone: "Music buried here a rich possession, and yet fairer hopes."

ROBERT SCHUMANN, WHO WROTE THE CHILDREN'S ALBUM

Robert Schumann was born at Zwickau, in Saxony, in 1810. There was no worrying care to make him unhappy, for his father was a publisher in easy circumstances. But there was a taint of insanity in the family. Schumann's sister died at twenty of an incurable melancholy; and Schumann himself spent his last years in a sanitarium, after trying to drown himself in the Rhine, near Bonn, where Beethoven was born.

We can understand, then, why most of his music is rather sombre. But we must remember, too, that he was the composer of the Children's Album. Schumann wanted to be a great pianist, and to that end contrived a tiny machine of his own for exercising the third finger, which is not so supple as the other fingers. The machine injured his hand, and he had to give up his ambition. But here, again, we have profited, for if Robert Schumann had been a great player, he might not have been a great composer.

THE GIFTED POLE WHOSE SUCCESS WAS SHORT-LIVED

Another writer of music for the piano wrote the most poetical, dreamy, emotional things that we are ever likely to hear from that instrument. The name of this composer was Frédéric Chopin. He was a Pole, born near Warsaw in 1809, and his music seems to breathe the romance that we commonly associate with his nation.

Frédéric Chopin was a weakly child, almost too frail and delicate to mingle freely with other boys. Tuberculosis had its hold on his family, and one of his sisters fell a victim to the disease. Fortunately for the world, the little musician escaped. The lad was only nine years old when he made his first appearance at a public performance and achieved marked success. Frédéric was devoted to the piano, and to enable his fingers to do justice to the arpeggios, in which he delighted, he invented a stretching device which he kept on his hands at night. He had a piano in his room which he played at all hours of the night, when the spirit moved him, until the housemaid thought he was not right in the head.

His father sent him to the liberal-minded conductor of the Warsaw Con-

servatoire, Joseph Elsner, to receive lessons in composition. A few years later, while still a very young man, Chopin was sent on a tour of the principal European cities that he might hear the best musicians of the day. At Vienna he was invited to perform. He did so, was hailed with acclaim, and became a recognized figure in the musical world. To Warsaw he returned, but an unfortunate love affair had a disastrous effect on his health and finally drove him to leave his native city. He visited a number of cities before deciding to settle in Paris. In addition to poor health his finances and his spirits were low. A recital at which Mendelssohn was present and applauded fervently brought him fame, but no money. He had decided to emigrate to the United States when Prince Radziwill took him to a *soirée* at the Rothschilds'. His playing was so superb that he was promised several pupils at once.

His fortune had turned; not only did pupils flock to him, but distinguished men and women centred their interest in him. Unfortunately his lungs began to trouble him, the first signs of the disease that was eventually to carry him off. At this period began his friendship with Madame Dudevant, better known as George Sand, the noted French woman novelist. The romantic friendship lasted for eight years, a portion of the time being spent on a Mediterranean island. When he and George Sand parted Chopin became a prey to grief and depression. He undertook a tour of Great Britain which brought him much honor. But the effort had been too much, for he returned to Paris to die after an illness of several months' duration. He was laid to rest in Père-Lachaise near the mausoleum of Rossini.

This "poet of the piano," as he has been called, left behind him works that have been unequaled of their kind. He created the ballade, the impromptu and the valse de salon. His nocturnes won renown for their great charm and nobility of feeling, while his twenty-four Studies have been accepted as standard works.

Felix Mendelssohn, the "Happy" Musician and Composer

Poor Chopin's life had been overcast by many shadows in marked contrast to that of another great composer who was born in the same year. This was Felix Mendelssohn. "Felix" means "happy," and happiness followed the possessor of the name. His parents were rich, so the boy knew none of the struggles that poverty had often imposed on his brother musicians. There was great understanding and affection between all members of the family, and Felix and his sister Fanny, also gifted musically, were especially close to each other.

His first composition, a cantata, was written when Felix was eleven years old. He turned out an enormous number of others in the next few years, but his first great work was the overture to A Midsummer Night's Dream, which he wrote when he was seventeen. This was the composition which startled England when Mendelssohn performed it in London three years later. After the concert the score was lost in the cab which took the young musician to his lodging, but Mendelssohn immediately sat down and rewrote it from memory without an error. The Scotch Symphony and the Hebrides overture were inspired by a trip through Scotland immediately after his London season. Visits to Italy and Paris followed. In 1832 the first of the Songs without Words appeared, but it made little impression on the public. When he was twenty-eight Mendelssohn married a charming wife, with whom he was extremely happy. His oratorio St. Paul brought him great praise, and he was called to Berlin by the king, but he was not content to remain there. He went back to Leipzig and founded a Conservatorium of Music. In 1846 he conducted the first performance of Elijah, which was written specially for the Birmingham Musical Festival. The work had exhausted him, and in his poor health came the shock of his beloved sister's death. Death came to him the next year. The world joined in mourning for the man who was not only a great musician, but a lovable and blameless being.

Berlioz and Wagner, Who Were Somewhat Alike in Aim

A strange genius, Henry Berlioz, had a great influence on orchestral music as it is known to-day. Berlioz was a Frenchman, born in 1803, and he was a musician who could compose but not perform on any instrument. His morbid disposition made the man his own greatest enemy, and his bitter satirical tongue drove away those who admired his ability. An unhappy marriage further embittered

his life. He was known as the most perfect orchestra-conductor of his time. Two of his greatest works were the Symphonie Fantastique and the Romeo and Juliet Symphony. It is recognized now that he brought France into line with the musical progress of the times.

It has been said oftentimes that Berlioz was unfortunate in that his work was overshadowed by that of Richard Wagner, who was born at Leipzig in 1813. Wagner's father died in the epidemic that followed the battle of Leipzig, and his mother married Ludwig Geyer, an actor. Geyer was a good stepfather to Richard, but he, too, died when the boy was very young. His influence, however, led the lad's mind to the theatre, and he wrote a tragedy when he was fourteen. He always hated the piano and never could play it well.

A hearing of one of Beethoven's symphonies turned Wagner's thoughts to music, and he determined to be a composer. He wanted to write operas, and he had the idea that the words are of equal importance with the music. Of course he was scoffed at, but he persevered. His first dramas, Rienzi, The Flying Dutchman, and Tannhäuser, were met with a lukewarm reception, and the composer was disheartened. His participation in the revolution of 1848 resulted in his flight to Paris, where he spent many years as an exile. Through the friendship of Liszt, Wagner's Lohengrin was performed at Weimar in his absence, but it met with indifference. It was Ludwig II, the mad king of Bavaria, who saved Wagner for a great future and gave the composer the financial support which enabled him to complete his masterpiece The Ring, made up of four musical dramas, The Rhinegold, The Valkyrie, Siegfried, and The Dusk of the Gods. Tristan and Isolde, The Meistersingers, and Parsifal completed his life's work. Before he died, in 1882, recognition had been given him.

THE HUNGARIAN WHO WAS A PRINCE OF PIANISTS

Berlioz and Wagner owed much to the friendship of Franz Liszt, Hungarian pianist and composer. Liszt was born in Hungary on October 22, 1811. His father was a clerk and an amateur musician. The interest of some Hungarian people of wealth was attracted to young Franz, and a subscription was raised to pay for the boy's tuition in Vienna and Paris. In the former city he studied pianoforte under the direction of Carl Czerny, and at the age of eleven years gave his first concert. Several years were spent traveling and studying in France, Switzerland and England. The arrival of the violinist Paganini inspired Liszt to try to find equivalents for the violin caprices, which made him perfect his technique in an extraordinary way. From 1833 to 1848 he was hailed as the master virtuoso. Then he gave up performing and devoted himself to study, conducting and composition for the next thirteen years. In 1861 he went to Rome and joined the Franciscan Order four years afterward. The final years of his life were spent between Rome and Weimar, though for some years he spent periods of time at the Hungarian Conservatoire of Budapest. Liszt died at Bayreuth in 1886.

Biographers have divided Liszt's life into three parts. The first part takes in the years before 1848, when he was the prince of pianists. The second period ended in 1861 and Liszt had won renown as a conductor. The third period covered the last years of his life, when he poured out compositions in great volume. Pianoforte pieces, songs, symphonic orchestral pieces, psalms, cantatas and oratorios were among the many productions of his rich musical mind.

Johannes Brahms, called by some music students the real successor to Beethoven, had a most uneventful life. He was born in Hamburg in 1833 and died in Vienna in 1897. He was intensely shy and loathed public appearances, and he could be extremely rude when he chose. Much of his music is fine and solid, but it lacks the emotional appeal of Beethoven's work.

A FAMOUS RUSSIAN COMPOSER AND HIS WORK

Among the names of Russian composers the one most familiar to us is that of Peter Tschaikowsky. Born in 1840, Tschaikowsky, like many other musicians, had to overcome opposition before he was able to follow the bent of his genius. He learned to play the piano in his childhood, but it was not intended that he should be more than an amateur. He was about twenty-one, and had been for some time a clerk in the Ministry of Justice at St. Petersburg, when his father

suggested that he should study harmony. For this purpose Tschaikowsky went to the Conservatory at St. Petersburg, and very soon he gave up his work at the Ministry of Justice to devote himself to the study of music. There he used his time to such good purpose that when he was twenty-five he was appointed professor of harmony at the new conservatory in Moscow.

Henceforth, until his death in 1893, his life was one of hard work combined with a struggle against ill-health and unhappiness. He is best known by his orchestral work, and his Pathetic Symphony is his greatest achievement. This Russian was a master of the expression of grief in music.

Lesser musicians who wrote popular operas

It is fitting that here should be told the stories of some of the musicians who, though not so great perhaps as those we have just read about, yet wrote operas that are known to every music-lover. Jacob Meyerbeer, a Jew, born in Berlin in 1791, was the son of wealthy parents. His mother did not think it quite the right thing for Jacob to be a musician and she used to explain carefully, "he is a musician but not of necessity." Meyerbeer had great talent, and composed several operas which are still favorites. Robert le Diable, Les Huguenots, and Le Prophète are the best known. Meyerbeer's two comic operas L'Etoile du Nord and Dinorah were once extremely popular. It was of Les Huguenots that Schumann exclaimed that its music was best fitted for circus people. Meyerbeer made large sums of money from his operas.

A famous trio of Italians—Rossini, Donizetti and Bellini—were contemporaries of Meyerbeer. Of these, Gioachino Antonio Rossini, born in Pesaro in 1792, was the greatest, yet his genius was the product of the strangest kind of environment. His father was town trumpeter and an inspector of slaughterhouses, and his mother was a baker's daughter. His father was imprisoned for political offense, so Gioachino was put under the care of a pork butcher. Later he was apprenticed to a smith. However, he managed to take lessons in music, and produced his first opera when he was eighteen years old. His first great success was Il Tancredi, but to-day The Barber of Seville and William Tell are more popular. That magnificent church composition, the Stabat Mater, has made the name of Rossini a household word perhaps more than his operas have done.

Rossini was the merriest of the musicians, with a great fund of humor and love for a joke. His quick wit was responsible for hundreds of good stories about him. As he was born on February 29, he had a birthday only every four years and when he was sixty-eight years of age he invited his friends to his seventeenth birthday party. It seemed as if in spirit Rossini never matured.

Opera-composers of the early nineteenth century

The short life of Vincenzo Bellini, who was born at Catania, Sicily, in 1801 and died thirty years later, was uneventful. His three operas which have survived are Norma, La Sonnambula, and I Puritani.

Gaetano Donizetti, born at Bergamo in 1778, was of Scottish descent, his grandfather having been an Izett of Perthshire. Gaetano's father wanted him to study law, but the boy insisted he would be an architect. Both father and son were wrong, for soon Gaetano discovered his real talent was for music. He had a most remarkable musical memory and could write down an opera after hearing it two or three times. He was also a rapid composer, and wrote his masterpiece, Lucia di Lammermoor, in six weeks. La Favorita and La Fille du Régiment are his other well-known operas.

Giuseppe Verdi, a fellow-countryman of the three foregoing composers, was destined to outshine them. He was born at the village of Roncole in 1813. His parents kept an inn and were very poor. Young Verdi received his first musical training from the village organist. For six years Verdi played the organ in the village church, receiving for that service a salary of less than twenty-five dollars a year. He wrote many operas, some of which were failures, while some have become classics. Ernani, Il Trovatore, La Traviata, Rigoletto, Aida, Othello, and Falstaff are operas whose airs have charmed all nations. Verdi suffered a great tragedy when his wife and two children were taken by death within the short space of two months. When he was eighty years old Verdi wrote Falstaff, a very fine piece of work. He lived to be eighty-eight.

Mention must be made here of Michael William Balfe, the gifted Irish composer who produced successfully operas in English, French and Italian. Balfe was born in 1808 at Dublin, and his musical ability became apparent when he was very young. He had an ambition to be an opera singer, but his début was a failure, and he turned his attention to composing. The Bohemian Girl is his best-known opera.

TWO FRENCHMEN WRITE ONE GREAT OPERA EACH

The two great names among French opera-writers in the nineteenth century were Charles François Gounod, born in Paris in 1818, and Georges Bizet, born in 1838, also in Paris. Both won the Prix de Rome at the Conservatoire. Gounod had a leaning toward religious music, and produced the oratorios The Redemption and Mors et Vita. Then he tried opera. His first efforts failed, but he kept on until he wrote Faust. At first this was ill received, but now it is a favorite among opera-goers.

Bizet, who was a generation younger than Gounod, was a musical prodigy who knew the scale before he knew the alphabet. The rules of the Paris Conservatoire were relaxed to admit so young a student. There he made a brilliant record, but afterward he had a hard struggle to earn a livelihood. Finally he produced Carmen, which met with instant success, but, tragically, Bizet lived only three months after his triumph.

Ruggiero Leoncavallo and Giacomo Puccini, two Italian composers born in 1858, produced operatic successes in the later part of the nineteenth century. Pagliacci and La Bohème were Leoncavallo's best works. Coincidentally, one of Puccini's successes was also called La Bohème. Tosca, Manon Lescaut, and Madame Butterfly are Puccini's other noted operas. Leoncavallo died in 1919, and Puccini passed away five years later. Another Italian opera-writer, born in 1863, and essentially a modern composer, is Pietro Mascagni, who in 1890 was wildly acclaimed for his short opera Cavalleria Rusticana.

SIR ARTHUR SULLIVAN'S FAMOUS LIGHT OPERAS

Now we may turn to an Englishman, Sir Arthur Sullivan—born in 1842, died in 1900—who, when he was studying at Leipzig, was believed by his teachers to be destined to become England's greatest composer. We cannot call Sullivan one of the very great composers, but he must have our thanks for all the pleasure he has given by his delightful comic operas. He fell short of true greatness in his grand opera and his oratorio work. We never think of that, however, when we are listening to the tuneful melodies, the bright, sparkling choruses, and the charming instrumentation of that long series of familiar works which he wrote.

In such delightful works as H.M.S. Pinafore, The Pirates of Penzance, Patience, and The Mikado he successfully established something altogether new in musical art. His comic-opera music "wears well," as we might say, and there is no reason why his operas should not be as popular fifty years hence as they are to-day. Many people know Sullivan only by these operas, but he was a versatile composer, and wrote some fine hymn tunes which can never die. One of them, the tune St. Gertrude, is the familiar Onward, Christian Soldiers.

GIFTED MUSICIANS OF MANY NATIONS

A contemporary of Sullivan was Edward Grieg, the Norwegian, who was born in Bergen in 1843. Like Ibsen, his ancestors were Scottish, and Grieg was always intensely interested in Scottish national music. Young Grieg's early desire was to be a painter, but Ole Bull, the famous Norwegian violinist suggested that he should be sent to study music. Grieg himself said that at the age of five he "discovered the chord of the ninth" and his joy knew no bounds. He composed many songs, piano pieces and sonatas. The favorite concert number of his is the Peer Gynt Suite. Grieg died in 1907.

Of the same period is Anton Dvorák, the Bohemian composer, who was born in 1841, the son of a small publican and village butcher. As a small boy Dvorák earned money among the fiddlers who played wild dance music for country revels. The poverty of his father handicapped the lad, who had to support himself while studying music in Prague. Working at high pitch, Dvorák managed to educate himself and to compose also. Before he died, in 1904, he had won fame as a master of the orchestra and a composer of real ability. His Slavic dances, symphonies and chamber

music hold a high place in musical opinion. From 1892 to 1895 Dvorák was head of the National Conservatory of Music of America in New York.

Claude Achille Debussy is France's most noted composer of the modern period. He was born at St. Germain-en-Laye in 1862 and died in 1918. His musical success came to him early. He was a winner of the Grand Prix de Rome at the Paris Conservatoire. A visit to Russia wrought a profound impression upon the young musician, and it is claimed that this experience inspired him to introduce a new system of color into music. Pelléas et Mélisande is Debussy's masterpiece.

In Sir Edward Elgar the English nation has a greater composer than in Sir Arthur Sullivan. Some people think that he may be reckoned among the musicians of the world. It was not intended that Elgar should be a musician, and after he was twelve years old he had no definite teachers. But his love for music was too great to allow him to adopt another profession. He had been brought up in a musical atmosphere—his father was organist of a church in Worcester—and he was able to go on and study by himself. The best works that he has written so far are his great oratorio The Dream of Gerontius and an orchestral symphony.

Thus far we have studied only about European composers, but there is one American composer who may be included among the great musicians. This is Edward MacDowell, who was born in New York in the year 1861. Unlike some of the other composers of whom we have been reading, his life was a happy one, and although in the early part of his career he had not much money, he had few difficulties to overcome. He studied in New York until he was about fifteen, and then, as he showed signs of genius, his mother went to Europe with him. He studied first in Paris. and afterward in Frankfort, where he lived for some years, and wrote some of his earliest works. For a time he taught at Darmstadt, and then settled down with his wife in a little country house near Wiesbaden. Soon, however, his work became known in his native land, and after a time he came back to America, to write and to teach, and to play in public, for not only did he write beautiful music, but he was a very good pianist. He first went to Boston and lived there for some years. Then he was called upon to go to New York to organize a department of music at Columbia University. In this work he was very successful, but after a time the task became too heavy for him and he resigned.

All these years he had been writing music with all his might, as if he knew that the time he had to work was short. Not long after he left the university his health broke down, and he became a helpless invalid. He died in January, 1908, and was buried in Peterborough, New Hampshire, where he had made himself a beautiful country home. The place is now a colony, a quiet and inspiring retreat for creative minds—composers, artists and writers. Although only forty-seven when he died, MacDowell had left the world, among other things, a long list of beautiful songs and some fine sonatas.

Among living German composers, Richard Strauss is the most famous, but opinion as to the greatness of his work is not yet decided. He has written much orchestral music, some operas, and wonderfully beautiful music for the piano.

THE NEXT STORY OF MEN AND WOMEN IS ON PAGE 7051.

Photo, courtesy Mrs. Edward MacDowell.

Colony Hall, the Community House of the Edward MacDowell Association, Peterborough, New Hampshire.

A spray of Wild Rose.

FLOWERS OF NORTH AMERICA

FLOWERS OF THE PACIFIC COAST

CONTINUED FROM 6667

WE have told you several times that the same trees and flowers are not found in all parts of North America. While some species are very widely distributed, each section has some which are not found elsewhere. Differences in soil and temperature, the presence or absence of high mountains, and the amount of moisture in the air are some of the reasons for these differences. To tell them all would require a book.

Taken as a whole, the flora of the Pacific coast is quite different from that of the other sections of the continent. While many of the species found in this region are the same as those found elsewhere, or are closely related to them, yet many others are quite distinct. For example, the Big Trees and the Redwoods (Sequoias) are found nowhere else.

Within the region itself are great differences of soil and climate, and, as might be expected, the same plants do not grow in all parts of it. In the north the climate is cool and moist, while in the south there is almost no rain. Parts of the region are between the two in these respects. Then, too, the same plants do not grow upon the high mountains and on the lower lands. We shall describe some of the more common flowers of the region, and the descriptions and pictures will enable you to know them when you find them.

The Trillium is one of the most abundant and attractive woodland flowers of early spring. The pure white of its flowers contrasts sharply with the darker background of humous soil and decaying vegetation so characteristic of the dense coniferous forests. Only the inner three of the showy parts of the flower are white, the outer three being green. As the flowers grow old the white parts of many of them change to a reddish color. The name trillium comes from a word meaning "three," the parts of the flower being conspicuously in threes. The plant belongs to the Lily Family. The species that is common in the woods of the northern Pacific coast region is a foot or more in height, has three large leaves a short distance below the flower, and grows from a short stout rootstock situated rather deep in the soil. This species is found from Alaska to California and Idaho.

THE DOG-TOOTH VIOLET IS NOT REALLY A VIOLET

The Dog-tooth Violet is another beautiful flower of the Lily Family. It is readily distinguished from the trillium by both its flowers and its leaves. All six of its outer flower parts are alike, and its two leaves are borne at the surface of the soil. The color of

the flower varies, being white, yellowish, purplish or pink in different species. The color of the leaves also varies, being green in some and mottled in others. The plant grows from a very short thick roundish stem situated deep in the soil. The name alludes to the fancied resemblance of the outer flower parts to the teeth of the dog. The name violet is somewhat deceptive, since the plant is not closely related to the true violets. A large species which is abundant on prairies and the borders of open woods from Vancouver Island to Oregon has yellowish flowers and brown-mottled leaves.

Bear Grass, from which baskets are made

Bear Grass, another member of the Lily Family, is a tall plant with large masses of white flowers at the top of the tall stem. It forms a striking feature of the flora of meadows and open woods on mountains, but is not found at lower levels. At the base of the plant there are numerous long slender tough leaves. Farther up the stem the leaves are shorter and less abundant. The leaves have been used by Indians for making baskets, and the plant is often called Indian Basket Grass. It is a perennial plant growing from a thick woody underground stem. It is found from British Columbia to California and Montana.

Skunk Cabbage, which has an unpleasant odor

Skunk Cabbage appears in swamps from Alaska to California in early spring. The individual flowers are very small and are crowded together on a fleshy stalk. This stalk, the flowers and the leaf-like organ that at first envelops them are golden yellow, and the young plant is thus conspicuous and attractive in appearance, though its skunk-like odor discourages close acquaintance. The leaves are smooth and bright green, and grow from the underground stem. They are broad and extremely large, often reaching a height of more than three feet, thus forming the most conspicuous feature of the plant in summer. This plant belongs to the Arum Family, which comprises also the eastern skunk cabbage and the Jack-in-the-pulpit.

Two orchids—Calypso and Rattlesnake Plantain

The Calypso, or Cytherea, is a small delicate orchid found in early spring in mossy woods from Alaska to Labrador and south to California, Michigan and Maine. The stem is erect, and grows from a whitish solid bulb, which also produces a single green leaf separate from the stem. Each stem bears a single flower at its summit, and has usually three bracts, the upper one being a slender purple structure, erect near the flower, and thus rather showy. The flower is purple or lavender in color and is showy. Its lower portion has the sac-like form that is characteristic of orchids. This and the five slender upward-pointing portions at its top readily distinguish it.

The Rattlesnake Plantain also belongs to the Orchid Family, but is better known by its leaves than by its flowers. Its leaves are evergreen and grow close to the ground in a rosette. They have numerous whitish lines extending both lengthwise and crosswise of the leaf, contrasting sharply with the green of the rest of the leaf and giving it a mottled appearance. The leaves are not very numerous and are about four inches long. In summer the plant has small whitish flowers along the upper portion of an erect and somewhat hairy or glandular stem often a foot tall. It is common in mossy woods and is found from British Columbia to Quebec and south to California and New York.

Miners' Lettuce, which is sometimes eaten

Miners' Lettuce is a low herb with very succulent leaves and stems, and numerous white or pinkish flowers with red veins in the petals. It gets its name from the fact that its stems and leaves are sometimes used for greens where other plants are not available. Some of the leaves grow from the base of the plant and have long leaf-stalks, but a single pair of leaves without stalks grows on the stem a short distance below the flower. It is abundant in open woods and is found from Alaska to California and Idaho. It belongs to the Purslane Family and is closely related to the spring beauty of central and eastern United States.

The yellow pond lily and its relatives

The Yellow Pond Lily is common in shallow lakes. Its leaves are large and roundish with a heart-shaped base, and either lie flat on the surface of the water or stand a little above it on round green leaf-stalks. Its stems are from two to six inches thick and grow horizontally in the mud. They are not at all woody, and

FLOWERS OF MOUNTAIN AND SWAMP

Several buttercups are found in the West. This is Suksdorf's Buttercup, one of the most attractive of all. It is abundant only in open places on high mountains, where it grows close up to the snow-line. It is about a foot high. The petals are bright yellow and soon fall.

The Skunk Cabbage of the Pacific coast is a member of the Arum Family, and does not differ greatly from the eastern type. Though attractive in appearance, its unpleasant odor will preserve it from the destruction which has come to so many of our wild flowers.

Upper photo, Linkletter Studio; lower, Asahel Curtis, Seattle.

have large air spaces in them. The flowers are raised above the surface of the water and are yellow, sometimes tinged with red. Insects are numerous in some of them. The seeds have been used as food by Indians. This species is found from Alaska to California and Colorado. It is closely related to the water-lilies that were dedicated by the Greeks to the water-nymphs.

THE WATER-SHIELD IS NOT CONFINED TO THE PACIFIC COAST

The leaves of the Water-shield form an almost complete covering on the surface of considerable areas in the shallow margins of lakes all along the Pacific coast. The creeping stem is in the mud at the bottom of the lake, and the long slender leaf-stalks extend up to the surface, where they are attached to the centre of the floating leaf-blades. The floating portion of the leaf is elliptical in shape, and is from two to four inches long. The whole plant, except the upper surface of the leaves, is covered with a tough transparent jelly. This is a common plant also in eastern and southern United States, as well as in Asia, Africa and Australia. Its flowers are dull purple and are borne just above the surface of the water.

BUTTERCUPS OF THE LOWLANDS AND THE MOUNTAINS

Buttercups are common in the Pacific coast region in both the lowlands and the mountains. They are usually readily distinguished from other herbs by their flowers. The flowers are usually yellow, and always have all four of the circles of organs—sepals, petals, stamens and pistils—separate and all borne on the receptacle. The sepals usually fall off early, and the petals are the most conspicuous part of the flower. The stamens and the pistils are numerous. A few flowers belonging to the Rose Family look somewhat like the buttercups, but are readily distinguished from them by the fact that their stamens are borne on the calyx. The Blotched Buttercup is one of the common species in the lowlands. It is a tall plant common in shady places. Its flowers are small, pale yellow and not showy; but its leaves are rather large, and each one has at its centre a dark blotch which contrasts sharply with the green of the rest of the leaf.

Suksdorf's Buttercup is one of the attractive flowers of Nature's wonderful gardens in the open places on high mountains. It blooms in July and August, and is found close to the snow in both the Cascades and the Olympics. The plant is one foot or less in height and is smooth. The petals are bright yellow and turned back, and fall off early.

THE WESTERN ANEMONE, A FLOWER OF THE MOUNTAINS

The Western Anemone is a plant of the Crowfoot Family and closely resembles the pasque flower of midwestern United States. It is, however, much larger than the pasque flower, and it grows in high mountains near the snow, while the pasque flower grows on prairies and dry hills. The western anemone has large lavender flowers, which come earlier than the leaves. Many fruits develop from each flower; each fruit has a long feathery appendage, giving the whole head a plume-like appearance. The leaves have many narrow divisions, and are borne on the erect stem some distance below the head of fruits. The plant has a striking appearance, especially when in fruit.

TWO SAXIFRAGES—YOUTH-ON-AGE AND FRINGED CUP

Youth-on-age is common in rich woods, and is easily recognized by the fact that many of the leaves have clusters of young leaves on the older ones at the point where the leaf-stalk joins the blade. As these leaves come in contact with the soil, roots are formed, and new plants thus originate from the old ones. The stems are from one to two feet tall, and the flowers are loosely distributed along its upper part. Some of the leaves are borne around the base of the stem at the surface of the soil and some farther up the stem. The outer part of the flower is purple. The plant is perennial, and the leaves remain green all winter in some places.

This plant was first collected by Archibald Menzies, who was the surgeon and naturalist with Vancouver during his exploration from 1790 to 1795. It belongs to the Saxifrage Family.

The Fringed Cup receives its name from the fact that the colored parts of its flowers are fringed on the edges. Its stems are hairy and are from one to three feet tall. The flowers, which are at first yellowish or greenish and later change to red or purple, are loosely borne along the upper part of the stems. It is an attractive flower, common in moist woods. Its underground parts live through the winter, and its stems, leaves and flowers grow

COMMON WESTERN FLOWERING PLANTS

The Salmon Berry has red flowers succeeded by edible berries, from the color of which the plant gets its name.

The Hard-hack is a common shrub in swamps and near water. The flowers are rose-colored, but soon give way to the brownish, unattractive fruit.

The Cat's-ear would be admired more if it were not such a pest on lawns and in pastures. It bears some resemblance to that other pest, the dandelion.

The Pearly Everlasting is a perennial herb which seems to flower in winter. These are not true flowers, but bracts surrounding the flower-heads.

Photos, upper left, Asahel Curtis; others, R. E. Chapman.

rapidly in spring. The flowers and flower-stalks have glands. The leaves are somewhat heart-shaped and are toothed at the margin. Like youth-on-age, it belongs to the Saxifrage Family and was first collected by Menzies. It is found from Alaska to California.

Oregon Grape, sometimes called Western Holly

Two kinds of Oregon Grape are familiar in western Washington, Oregon and British Columbia. Both are shrubs with yellow wood and long evergreen leaves consisting of several pairs of spiny leathery leaflets with an odd leaflet at the end. Both bear long clusters of yellow flowers in spring, and in late summer produce black or bluish berries with a whitish coating on them.

The two are readily distinguished by the height of their stems and the character of their leaflets. The one called the Dull Oregon Grape has very short stems, so that its leaves seem to come almost from the surface of the soil. Its leaflets are dull green in color, somewhat spiny, and their nerves come from the midrib in a somewhat feather-like arrangement. The Tall Oregon Grape has taller stems, usually three feet or more high, and very shiny, very spiny leaflets with three nerves from the base. This one is sometimes called Western Holly. The dull one is very common in open coniferous woods, while the tall one is less abundant and is usually found in gravelly or rocky places. The underground stems of both are an official drug, but the market for the drug is not large. The fruit of the dull one is often used for jelly. Both belong to the Barberry Family.

Sweet-after-death, another member of the Barberry Family

This is a delicate herb appearing in early spring in open woods in the coast region from British Columbia to northern California. It has an underground stem from which grow a single leaf about a foot high with three fan-shaped leaflets at its top, and an erect stem of about the same height with numerous small white flowers crowded close together at its top. The plant is fragrant when it dries, its odor being somewhat vanilla-like. It belongs to the same family (Barberry) as the Oregon grapes, though its general appearance is very different. The similarity to the Oregon grapes lies in certain botanical characters of its flowers.

The Bleeding Heart and its cultivated relative

This is a low smooth delicate herb with pink or rose-colored flowers, common in moist woods from British Columbia to California in the coast region. Its stems and leaves grow from perennial underground parts. The flowers are borne loosely along the upper portion of the stem. The leaves are divided into many narrow lobes. This plant belongs to the Poppy Family and is closely related to the cultivated bleeding heart and also to the Dutchman's breeches, common in northern United States and portions of southern Canada.

The Pitcher Plant, which eats insects

The Pitcher Plant is an herb which is very common in the marshes and sphagnum bogs of southwestern Oregon and northern California. The plant has a slender brittle stem from one to three feet tall, with a few small leaves scattered along it and a single large brownish flower at its top. The "pitcher" leaves come from the part of the plant that is imbedded in the moss or other vegetation. The leaf is a foot or more in height, and consists of a tube enlarging gradually from the base to the top, which is covered with a translucent mottled hood having a slender projection at each side. There are reddish lines extending down the body of the leaf from the hood. The remains of insects are commonly found in the base of the tube inside of the leaf, and it seems that the leaf uses the insects for food. The whole leaf presents a somewhat bizarre appearance and, looking like a sort of fairy puzzle, must excite the curiosity of an insect if it has any. This plant belongs to the Pitcher Plant Family, but differs somewhat in the form of its leaves from the pitcher plants found in the bogs of eastern United States.

Sundew, another plant that eats insects

The Sundew is another plant that uses insect food, but it is quite different in appearance from the pitcher plants. It is a small reddish herb, very common in the sphagnum moss of bogs from Alaska to Labrador and southward to California and Florida. It is common also in Europe and Asia. Its leaves form a rosette on the surface of the bog, and its slender stem is erect and bears from five to twenty small white flowers. The leaf of

ATTRACTIVE FLOWERS OFTEN SEEN

The Western Anemone is an interesting plant of the Crowfoot Family. The large lavender flowers appear earlier than the leaves. It grows in the mountains.

The fruits of the Western Anemone look almost like flowers themselves on account of their feathery appearance.

The Trillium, common on the Pacific coast, has showy white flowers which change to reddish as they wither. It grows a foot or more high.

The Shooting Star is a showy plant with rather odd-looking flowers resembling the cyclamen. Some species grow in arid regions, others in wet places.

Upper photos, Linkletter Studio; lower, Asahel Curtis.

the commonest species consists of a rounded blade borne on a slender leaf-stalk. On the blade are numerous glandular hairs each having a drop of red sticky liquid at its summit. These shine in the sun and give the plant its name. Insects are caught and held fast in this sticky liquid. They are pressed down to the surface of the leaf by the bending of the hairs and are there digested. The remains of insects are readily found in many of the leaves. The plant is an official drug, its fluid extract being used as a remedy for certain disorders.

THE RED-FLOWERED CURRANT, A SHOWY WESTERN SHRUB

The Red-flowered Currant is a very showy shrub from three to nine feet tall, bearing numerous red flowers in early spring. It is common in open woods from British Columbia to California in the coast region. It is easy to transplant and is commonly seen in yards and parks. The fruit is a black, slightly hairy berry covered with a whitish powder, and is not attractive as food. The plant is very ornamental for a short time in the spring when in flower, but is very ordinary-looking in summer when in fruit. It belongs to the Gooseberry Family.

THE HARD-HACK, WHICH LIKES DAMP GROUND

This is a shrub four or five feet tall forming dense thickets in swamps and on lake margins. In midsummer it is conspicuous and attractive because of the dense masses of rose-colored flowers along the summit of the stem above the leaves. In late summer, however, the bright color of the flowers gives way to the dull brown of the small pod-like fruit and the plant becomes less conspicuous. This shrub is common in the coast region from British Columbia to Oregon. The first specimens of it were collected by David Douglas, a Scotch botanist who collected in this region at various times from 1824 to 1832.

OCEAN SPRAY, COMMON IN THE OPEN WOODS

Ocean Spray is a tall shrub with large masses of white or yellowish flowers. It reaches a height of from six to fifteen feet, and is very common in open woods, especially on banks and rocky places. It is an unusually attractive plant for a short time in summer, but when its flowering season has passed it is much less beautiful. This plant has very hard wood, and is said to have been used by the Indians for arrows. The leaves are simple and are not evergreen. The plant was first collected in 1806 by Lewis, of the famous Lewis and Clark Expedition.

NUTKA ROSE, FIRST FOUND ON VANCOUVER ISLAND

The Nutka Rose is a tall plant with large showy flowers and large red fruit. The plant sometimes reaches a height of seven feet. Many of its flowers are more than two inches broad, and its fruit is often three-fourths of an inch thick. Its prickles are stout but few, as compared with some other wild roses. This plant was first collected at Nootka Sound on the west coast of Vancouver Island, and is found from Sitka, Alaska, to California and Utah. Several other wild roses are common on the coast, and a sweet-briar has been introduced and now runs wild.

PURPLE MARSH-LOCKS, ANOTHER MEMBER OF THE ROSE FAMILY

Purple Marsh-locks is a perennial herb with dark green leaves and large purple flowers, common in marshes and bogs, especially at the margins of ponds and lakes. Its stems are prostrate and numerous, and they grow rapidly forward into the water, thus helping in the filling of ponds and lakes. In summer, when their flowers are at their best, these plants form a particularly conspicuous feature of many shallow lake margins. When the flowers have faded, the plants may be recognized by their dark green compound leaves and the spongy disks on which the flower parts were borne. It belongs to the Rose Family. It is most characteristic of northern regions, but is found in California.

THE SALMON BERRY, VALUED BOTH FOR FLOWERS AND FRUIT

The Salmon Berry is a tall, somewhat prickly shrub with red flowers and salmon-colored or garnet edible fruit. The petals are the most conspicuous part of the flower. The pistils and stamens are numerous and are borne on the corolla. The fruit resembles the raspberry in the fact that the receptacle comes off with the berry when it is picked. When a blackberry is picked the receptacle remains on the plant. The salmon-colored berries have the better flavor, though the garnet ones are also edible. The two kinds of berries are borne on separate plants, the one bearing the garnet fruit being distinguished, even in flower, by its purplish twigs. The young fleshy shoots are sweet and are said to have been eaten

FOUR BEAUTIFUL FLOWERING SHRUBS

Salal is one of the commonest evergreen shrubs of the West. It bears white or rose-colored flowers, which appear late in the spring.

The Red-flowered Currant is a showy shrub which is often transplanted to lawns. The blackish berry is not edible. It belongs to the Gooseberry Family.

The Dogwood in the West is even more beautiful than in the East, and sometimes grows into quite a large tree. It is often transplanted to lawns.

The Sticky Balm is a showy shrub bearing masses of small white flowers, with a pleasant odor. The plant is an evergreen.

Photos on this page and on *6927* by Asahel Curtis.

by the Indians. Though the prickles of this plant are rather weak, they are strong enough and numerous enough to make traveling through a salmon-berry thicket a rather unpleasant experience. The bark of the older stems peels off in shreds. The leaves are compound, being composed of three leaflets. This plant is found in wet bottom lands and along streams from Alaska to California and northern Idaho. It occurs in lowlands and also up to 2,000 feet elevation on mountains. It was first collected in 1806 by Lewis, of the famous Lewis and Clark Expedition.

BROOM HAS BEEN INTRODUCED FROM EUROPE

The Broom is a shrub with stiff green angular twigs, yellow flowers and flat pods. It has been introduced from Europe and is spreading rapidly along the coast. It is common in the Puget Sound region, and forms dense thickets on Vancouver Island and elsewhere in southern British Columbia. It is also found in eastern United States. A variety with white flowers is occasionally seen in Washington and British Columbia and also one whose flowers are yellow and have some red portions. The twigs of this plant are an official drug, but the market for it is not extensive. The plant belongs to the Pulse Family along with peas, beans and vetches.

STICKY BALM OFTEN FOLLOWS FOREST FIRES

The Sticky Balm is a large much-branched shrub with showy masses of small white flowers. It has a pleasant cinnamon-like odor. Its leaves are thick and evergreen, shiny on the upper surface, and rather sticky. They are somewhat heart-shaped and have three nerves from the base. This shrub forms dense thickets, especially on gravelly soil where the forest has been burned, and is found from British Columbia to California, Colorado and the Dakotas. It is another of the plants collected by David Douglas during his adventurous botanizing trips in the Pacific Northwest.

VIOLETS ARE EVEN MORE COMMON THAN IN THE EAST

Violets are common in the Pacific coast region in both the lowlands and the mountains. Some kinds have yellow flowers, others have blue or violet flowers, and one has white flowers. Some are found in open woods, others in swamps and bogs, and some are especially abundant on the prairies. The Evergreen Violet is common in open woods in the lowlands and is also found on mountains. Its leaves remain green all winter, and it produces a profusion of yellow flowers in early spring. In some parts of western Washington there are gravelly prairies, and portions of these are carpeted in early spring with blue violets of remarkable beauty.

THE DEVIL'S CLUB DESERVES ITS UNPLEASANT NAME

The Devil's Club richly deserves its name. Anyone who has had the experience of slipping while walking a fallen log in the swampy forest and grasping the spiny stem of this plant for support, or who has had the misfortune to step on the prostrate portion of one of its stems and has as a result been struck in the face by the erect portion, may have felt that even this name was not strong enough to express his opinion of the plant.

It is a shrub whose stems are flexible, sometimes twelve or fifteen feet long, including both the prostrate and erect portions, producing very few branches and thickly covered with very stiff sharp prickles—a suitable club for his Satanic Majesty. In spring the plant produces at its top several large spiny sharply lobed leaves often as much as a foot in diameter. In summer it produces above the leaves a showy cluster of cream-colored flowers which later produce conspicuous scarlet berries.

In the Pacific coast region this plant ranges from Kodiak Island, in Alaska, to California. In Washington it is found in the mountains, both in the Cascades and in the Olympics. It is found also in the Rocky Mountains and occurs as far east as Isle Royale in Lake Superior. With all its striking qualities this plant is likely to be known to anyone who has had much experience in the forests of the Pacific Northwest.

THE DOGWOOD TREES OF THE WESTERN REGION

Among the most beautiful flowers of the Pacific coast region are the large white flowers produced so profusely in spring by the Dogwood tree. The showy part is not the flowers themselves, but consists of the large white bracts surrounding the head of small flowers. In autumn the trees produce showy red berry-like fruits which soon fall. The dogwood is a small tree whose stems in the forest frequently grow in clusters. Its branches occur in

pairs on opposite sides of the stems, but these pairs are frequently so close together that the branches seem to come in groups. The leaves are opposite, and fall in autumn. The dogwood is readily transplanted, and is a very attractive tree for street planting and for parks. Its wood is hard and tough and is used for sledge-handles, wedges for splitting logs and for other purposes.

Two other dogwoods are common in the Pacific coast region. One is a perennial herb with small flower-heads and short bracts, common in mountain regions and also found occasionally in wild cranberry marshes and open woods in the lowlands. The other is a shrub with red twigs and cream-colored flowers without bracts, common in wet places.

THE WINTERGREEN IS COMMON IN THE WESTERN WOODS

Several species of wintergreen are common in the coniferous woods of the Pacific coast. They are low smooth perennial herbs with red, white or pink flowers on an erect stem. Most of them have evergreen leaves spreading in a rosette from the base of the plant, but some have no leaves at all. One of the commonest and most attractive kinds in the Puget Sound region has thick leathery leaves with blades three inches or more long and leaf-stalks of about the same length. It has rather numerous dull red, irregular flowers borne along a stem a foot or more in height.

THE PINESAP, A NEAR RELATIVE OF THE INDIAN PIPE

Several odd-looking plants occurring in coniferous forests are entirely devoid of the green color that most plants have. This means that they do not have chlorophyl, the green substance that enables plants to manufacture food from the carbon dioxid of the air and the water of the soil. Since these plants cannot manufacture their own food, they either live as parasites on the roots of green plants or obtain their food from decaying organic matter, mainly the remains of vegetation. In the latter case they are called saprophytes.

One of the commonest of these saprophytes in the coniferous woods of the Pacific coast is the Pinesap. It is a reddish or yellowish plant from four to sixteen inches tall, with scale-like leaves, whose underground portion consists of a mass of fleshy roots. It bears several flowers which at first are nodding, but later become erect. This plant is found from British Columbia to New Brunswick and southward to Arizona and Florida, and also in Europe and Asia. It is closely related to the Indian Pipe, a waxy white or sometimes pink plant which is also widely distributed and occurs in rich woods.

THE RHODODENDRON, THE STATE FLOWER OF WASHINGTON

The Rhododendron is one of the most showy flowers of the Pacific coast region. The plant is an evergreen shrub usually from six to nine feet tall, but sometimes reaching a height of eighteen feet. In late spring it produces large clusters of beautiful rose-colored or pink flowers. The petals are united, forming a bell-shaped corolla from one and a half to two inches long. The flower has ten stamens curving at the tip. The anthers discharge their pollen by the opening of a pore at the top, instead of splitting open as the anthers of many flowers do. The fruit is a capsule splitting into five parts. The leaves are attractive in appearance, being green and shiny. They are from four to six inches long, and are somewhat inrolled at the edges. This rhododendron is found from British Columbia to California in the coast region, and is the state flower of Washington. It is local in its distribution, though usually abun-

Photo, Linkletter Studio.

The Rhododendron is a shrub which sometimes reaches the height of eighteen feet. Both leaves and flowers are attractive. It is the state flower of Washington.

dant where it is found at all. It flourishes well in some of the logged-off and even the burned areas in western Washington, especially on gravelly hills. It is a near relative of the rhododendrons and azaleas of eastern United States. Another species of rhododendron is found in the mountains of Washington and other portions of the Northwest. It has white flowers and deciduous leaves.

LABRADOR TEA, WHICH ALSO GROWS IN THE EAST

Labrador Tea is a low slender evergreen shrub common in cranberry marshes

Photo, Linkletter Studio.

Bear Grass is a member of the Lily Family which grows only in the high country, generally on mountains. Indians used to make baskets from the leaves.

(sphagnum bogs) and growing taller and often forming dense thickets in wet areas bordering these marshes. Its leaves are mainly at the top of the stem, are inrolled at the edges and covered on the lower surface with a dense growth of rusty brown hairs. It produces at the top of the stem an abundance of white flowers in late spring. Its fruit is a small capsule splitting into five parts. It is found from Alaska to Greenland and southward to New Jersey, Wisconsin and Oregon. It belongs to the Heath Family along with the heathers, the rhododendrons, swamp laurel and salal. A taller kind, with hairless leaves, is common in bogs and open woods in parts of Oregon and is also found in southwestern Washington.

SWAMP LAUREL, FOUND ONLY IN MARSHY PLACES

The Swamp Laurel is a low evergreen shrub whose flowers are perhaps the most beautiful wild flowers found on the Pacific coast excepting those of the rhododendron. It is not so well known as it deserves to be. The explanation of its rare charms being so unfamiliar to flower-lovers is that it is found only in cranberry marshes. Where the forests are not cleared these marshes are rather isolated places, difficult to visit because of the very wet, swampy character of their borders. Where the forest has been removed many of these marshes are drained and burned in an attempt to bring the drier parts of them into cultivation, and the swamp laurel is thus killed. To the marshes in their natural condition its wonderful profusion of showy red or rose-purple flowers imparts in late spring a beauty that is rarely matched. The corolla of the flower is saucer-shaped and is about three-fourths of an inch broad. Each anther is at first held in a little fold in the corolla, but as the flower grows older the anthers snap loose when the flower is touched, discharging a little cloud of pollen. Its leaves are shiny on top, inrolled at the margins, and covered on the lower surface with a whitish powder. Its geographical range is similar to that of Labrador tea. It is closely related to the mountain laurel of eastern United States.

TWO EVERGREENS—THE HEATHERS AND SALAL

The heathers are low evergreen plants forming dense mats in mountain meadows and often found among trees at high elevations. They are in blossom in midsummer when visitors most commonly go into the mountains, and contribute much to the beauty of the region at that time. The White Heather has white bell-shaped flowers scattered along the stem, each one nodding on its erect flower-stalk. The stems have erect branches and are covered with small leaves pressed close against the stem, giving the plant a somewhat moss-like appearance. It is found from Alaska to California.

The Red Heather is larger and stouter than the white one and is often found

with it. It has showy red or rose-colored flowers borne in groups, each on its own flower-stalk at the top of the plant. It is found from British Columbia to Wyoming and California.

Salal is perhaps the commonest evergreen shrub of the coniferous forests in the Puget Sound region, and is found from British Columbia to central California, west of the Cascades and the Sierras. Though its stems are not stout, and are usually crooked and tend to assume a reclining position with only their newer portions growing erect, it usually attains a height of from two to four feet, and sometimes grows much taller. Its leaves are smooth and leathery, and are attractive in appearance. They are from two to four inches long, rather broad, heart-shaped at the base, and minutely toothed. Its flowers are white or rose-colored and appear in late spring. In summer it has black berries which are edible but are not prized as food where other berries are obtainable. A smaller species found in the Cascade Mountains and the Olympics has a spicy delicious red fruit.

THE SHOOTING STAR, WITH ITS ODD-LOOKING FLOWERS

Several species of Shooting Star are found in the Pacific coast region. They are showy herbs with basal leaves and an erect stem bearing several odd-looking flowers resembling those of the cyclamen. One species, with nodding purple flowers, is abundant on the dry prairies of the Puget Sound region, and a somewhat similar one is common in wet places in the mountains. The fruit of these plants is a many-seeded capsule.

TWO GENTIANS, FOUND ONLY IN THE WEST

The Gentians are herbs with opposite leaves and showy flowers. A low species with tufted stems and deep blue flowers is one of the most attractive and abundant flowers of late summer in the meadows on Mount Rainier. It was first collected by Dr. Tolmie, a medical officer of the Hudson's Bay Company, who was the first botanist to visit this mountain. He obtained his specimens in 1837 near the Puyallup Glacier. A taller species, with pale green leaves and blue flowers, usually dark-spotted inside, is found in the wild-cranberry marshes of western Oregon and southwestern Washington. Several species of gentians are found in eastern United States, but these two species are found only in the west.

THE DODDER, WHICH IS A GREEDY PARASITE

The Dodder most commonly found on the coast is a slender yellow or orange-colored vine parasitic on saltwort and other plants in salt marshes. It is conspicuous because it often forms dense yellow patches several feet in diameter which are easily seen at a distance in these marshes. Having no chlorophyl, it cannot make its own food, and gets its food by sending short roots into the fleshy portions of the plants on which it grows. It produces rather numerous small white flowers. Several other species of dodder are found on the coast. They are parasitic on various herbs and shrubs. Some are parasitic on clover and other plants of economic importance, and thus are bad weeds. Dodders are found in practically all parts of the United States and also in Europe and tropical America, and often do great damage to cultivated plants.

THE TWIN FLOWER MAKES THE WOODS ATTRACTIVE IN SUMMER

The Twin Flower is an evergreen vine with slender stems from one to three feet long forming dense growths in open woods. It either creeps on the ground or trails over logs and other objects. The leaves have short stalks, and their blades are usually less than an inch long, somewhat roundish or oval, and slightly wedge-shaped at the base. The flowers are borne in pairs on an erect stalk a few inches tall. The corolla is purple or whitish, is funnel-shaped and slightly hairy inside. The great profusion of these flowers and the beauty of their form and color combine to make this one of the most showy and attractive flowers of the woods in summer. This plant was a great favorite with Linnæus, the great Swedish botanist, and in many of his pictures he has a piece of the blossoming plant in his hand. It was given the botanical name *Linnæa* in his honor.

THE SNOWBERRY, COMMON OVER A WIDE RANGE

The Snowberry is a low branching shrub with white or pink flowers and conspicuous white berries. This plant loses its leaves in winter and is scarcely noticed then. In spring it is noticeable because of its rather numerous pink blossoms, and in summer it is conspicuous because of

its showy white berries. In the Pacific Northwest this shrub is common in open woods. It is found as far south as California, as far north as Alaska and as far east as Massachusetts.

THE CAT'S-EAR, WHICH RESEMBLES THE DANDELION

The Cat's-ear is a troublesome weed resembling the common dandelion. Like the dandelion, it is beautiful when in flower, unattractive when in fruit, and spreads rapidly, to the detriment of the grass in lawns and pastures. It is common in Washington and British Columbia, and is spreading rapidly. It is readily distinguished from the common dandelion by its leaves and its flower-stalks. The leaves of the cat's-ear are hairy and have rounded lobes, while those of the dandelion are smooth and have angular lobes. The flower-stalks of the cat's-ear are not hollow and are branched, with a head of flowers at the end of each branch, while those of the dandelion are hollow and unbranched. Its principal blossoming time is a little later than that of the dandelion.

There are two kinds of Oregon Grape in the West, one very short and the other three feet or more tall. Both are evergreen shrubs of the Barberry Family. This is the Tall Oregon Grape. Photo, R. E. Chapman, Seattle.

PEARLY EVERLASTING KEEPS ITS BEAUTY INTO THE WINTER

The Pearly Everlasting is most attractive in late autumn and even early winter, when many other plants have lost their beauty of leaf or flower or fruit. It is a rather woolly perennial herb with straight erect leafy stems and numerous small heads of flowers. The bracts which surround the flower-heads are pearly white, and it is these that retain their beauty and give attractiveness to the plant in its autumn or winter condition. They are slightly sweet-scented and often are used for funeral wreaths.

They are love's best gift,
Bring flowers—pale flowers.

Pearly everlasting is abundant in the lowlands in open places, especially burned areas, and is also found at low elevations in the mountains.

THE PINEAPPLE WEED RESEMBLES THE DOG-FENNEL OF THE EAST

The Pineapple Weed is a small herb somewhat resembling the eastern dog-fennel. The most striking points of similarity are that both are weeds, both have heads of yellow flowers, and both have leaves with many slender divisions. The striking points of difference are that the dog-fennel has white ray flowers around its flower-heads, while the pineapple weed has no ray flowers at all; and that the dog-fennel has an unpleasant odor, while the pineapple weed has, when bruised, a pleasant odor resembling that of pineapple. The cat's-ear, the dandelion, the pearly everlasting, the pineapple weed and the dog-fennel all belong to the Composite Family, along with the asters, the goldenrods, the sunflowers and many other plants. The plants of this family have their flowers in dense heads on a common receptacle, surrounded by one or more circles of leaf-like bracts.

Space forbids us to do more than mention the reeds, grasses, sedges and rushes which "make music" on the Pacific coast and mountains. We find the Broad-leaved Cat-tail, familiar as the "false sceptre" painted in the hands of the Savior in the pictures of old Italian masters; the Simple-stemmed Bur-reed, with bur-like brownish flower-head and reed-like stem; the Marsh Arrow Grass, with narrow leaves tapering to a point and greenish yellow flowers; Alpine Timothy; Hare's-tail, a soft fluffy-beaded sedge; Tussock Sedge, with its many relatives; and the Alpine Bog Rush.

THE NEXT STORY OF PLANT LIFE IS ON PAGE 7085.

THE STORY OF THE TABLE ROUND

ONE day as Caxton, the inventor of printing, sat by his press in Westminster Abbey, there came to him certain noble gentlemen asking how it was he did not print in a book the famous stories of King Arthur and his Round Table. It seemed to these good men that, after the Bible, the legend of Arthur should be the first book printed, for to them these tales of a great British chieftain were true as gospel. Glad are we that Caxton listened to this request, for by his book we now know the beautiful and mystic legend. These stories have been told to children, and have been the delight of all for centuries. They are England's share in the world-literature of chivalry. Here is the story of the beginning of the Round Table; also some of the deeds of Arthur's knights. Elsewhere in the book we shall find some further tales from this wonderful store of the early English legends.

KING ARTHUR AND HIS KNIGHTS

THE COMING OF THE KING

CONTINUED FROM 6794

ON a bright, crisp spring morning in Eastertide some years after the Romans had withdrawn from Britain, there rode toward Westminster, on the banks of the Thames, a pleasing trinity of horsemen—an old, cheerful-faced knight named Sir Hector; his handsome young son, Sir Kay, only just dubbed knight; and a beautiful fair-haired youth of a most noble and kingly bearing, who, nevertheless, seemed more to desire the good fortune and happiness of the other two than to consider himself.

As they rode merrily forward a sudden vexation overspread the face of Sir Kay, and he reined in his horse, exclaiming, with all the annoyance of youth, "I have left my sword behind me!" Sir Hector laughed with a loud delight, for here was a young man riding to a tournament who had thought most carefully of his little mustaches, his fine apparel, his spurs and the accoutrements of his horse, but had forgotten his sword! Sir Kay, though he laughed, flushed under his father's banter and he was glad when the noble youth at his side turned the current of laughter by announcing his intention of riding back to get the sword for Sir Kay.

Back rode this handsome youth, whose name was Arthur, glad to do a service for his friend; but on coming to the house he found it locked and silent, for every one of the attendants had pressed forward to the famous tournament at Westminster. Arthur's brows clouded as he looked at the silent walls and the closed windows. What would his friend do at the tournament without a sword? What misery for him! What vexation! Never would Sir Kay hear an end of Sir Hector's banter.

As he mused in this manner it came to his mind that there was, in a field by Westminster, an extraordinary sword stuck so fast in an anvil that no man could move it. Stories had reached his ears about this sword ever since Christmastide—strange stories. Some even said that he who could draw the sword would be chosen rightful king of Britain. Arthur thought that, whether these stories were true or not, he would at least try to get the sword for his friend and half-brother, the bold handsome Sir Kay.

As soon as this thought occurred to him he rode forward and came to the anvil, which was set in a stone, and climbing thereon, he lifted the sword easily from its cleft. He must have thought the story was an idle jest. For there stood the large anvil in the field, the Thames flowing by in the distance, and nowhere that his eyes looked could he see any man guarding the sword. It was evidently set there for a jest, and the ease with which it came from the anvil convinced him that the story, at least in its meaning,

had been exaggerated. Cheerfully he rode forward and overtook Sir Hector and his son. But Sir Kay, taking the sword with a bright word of thanks, turned it over, and his face became deadly white, and he questioned Arthur how he came by it. Arthur told him.

"Then am I," cried Sir Kay, with a loud voice, turning quickly to his old father, "king of Britain?"

Sir Hector grew very solemn, and demanded of his son how he came by that sword. Sir Kay told him. Then the old knight, raising his eyes to the boy Arthur, dismounted from his horse, and bending his knee at Arthur's stirrup-leather, said: "Sir, I perceive that thou art my King, and here I tender thee my homage."

Sir Kay did likewise.

Then they rode to tell the Archbishop all that had happened. Strange must it have seemed to Arthur, who had taken the sword to do another a kindness, that this simple little act of friendship and love had made him king of Britain.

But Arthur did not know the story of his birth. All he knew was this—that he had grown up side by side with Sir Kay under the roof of the brave Sir Hector, that they had been like brothers together, and that always Sir Hector had treated him with love, and yet withal a certain restraint, as though to do him reverence.

How the boy Arthur came to live in the house of Sir Hector may be briefly told. The father of Arthur was one Uther Pendragon, king of Britain, and this king loved a lady who cared not for him and would not be his wife. There came to him Merlin the Wizard, who said to the King, "Grieve not, Pendragon, for I will give this lady to you; but first swear to me by your honor that the son which shall first be born to you you will give to me." The King promised. Then Merlin gave to the King a change of aspect which pleased the disdainful lady, and she became his Queen. And when the son was born, named Arthur, the King gave him to Merlin, and the Wizard took the child and carried him to Sir Hector, and bade the good knight to bring up the child with the little Kay.

Now, why did the wise Merlin do this? Because he knew the trouble that was coming. Uther Pendragon died, and immediately there was rebellion and riot in the land, the nobles fighting against each other, and in their pride trampling down the crops of the peasants and slaying so many good men that the whole kingdom was brought to waste and ruin. The little Arthur would certainly have been killed had he been found on the Queen's knee. But Merlin waited, and when Arthur was grown to man's estate, and was kingly enough to take and keep his kingdom, then Merlin went to the Archbishop and bade him call to Westminster at Christmastide all the barons and knights of that realm, that they might pray Heaven for peace and deliverance from ruin, and there should be seen a great marvel.

And it came to pass when the great nobles came forth from the Abbey on Christmas Day that they beheld an anvil set on a stone, and in the anvil, as though a giant's stroke had cleft it there, a sword strong and mighty; and they approached and saw written on the stone: "Whoso can draw forth this sword is rightful king of Britain born."

All the barons rushed greedily to wrench out the sword, but each man failed, and was astonished and angered. Then said the Archbishop that there should be held a great tournament at Eastertide, and then, once again, the barons and knights should tug at the sword for the crown of Britain.

Imagine the surprise and indignation of the great, fierce barons when they learned at Eastertide from the Archbishop how that Arthur had drawn the sword easily, no man seeing him, and that he was rightful king of Britain. They roared their dissatisfaction. "Let us see it done with our own eyes," they said.

"If he pulled it out, let him press it back and do it again."

So they all rode back to the anvil set on a stone, and he who had ridden so humbly to the tournament, almost as the squire of Sir Kay, now found himself the centre of a dense mass of men, all their eyes gazing upon him.

The spring sunshine fell upon his fair hair, and the people, seeing him on the stone—young, beautiful and strong, with the sword in his hand and his eyes bent upon them—felt a strange stir in their blood. And they were glad—so glad that their cries of "Arthur is king!" rent the air when he forced back the sword and drew it forth again as if it were a withy from the stream.

Yet were the barons not satisfied. "What this boy can do a man can do," they argued. And the sword was put back, and one by one the barons wrenched at it, but in vain.

Then at last they acknowledged Arthur as their king, and the Archbishop set the crown upon the fair head of the young man, and the people filled those happy Easter skies with their shouting, for the face of Arthur was like a blessing, and from his eyes there seemed to fall a healing peace upon the sorely wounded land of Britain.

THE FOUNDING OF THE KINGDOM

THE COMING OF THE QUEEN AND THE MAKING OF THE ROUND TABLE

SCARCELY had Arthur promised peace to his land when a number of kings who swore they would never acknowledge this magic-chosen monarch as a rightful king linked their forces and came up against Arthur in battle. So Arthur, who longed to give his people peace, was obliged to fight, and two good kings of Gaul, Ban and Bors, came to his aid, and he fought with his enemies and overthrew them in a mighty battle. But now, once again, he was unable to devote his days to peace, for Ban and Bors begged him to bring his army to their rescue in Gaul, where they themselves were threatened by enemies. So Arthur went with his allies and fought with them. Glad was he, indeed, when the war was over, and he returned to his own land.

But what a kingdom it was! War had trampled it into the likeness of a wilderness: the forest had spread itself out and conquered the tilled fields; weeds, rank and gross, grew in the gardens; the huts of the peasants were in ruins; and, worst of all, misery had so worked in the hearts of the people that they had turned against God and were living fierce, evil and barbarous lives. In those days the woods were full of robbers. Ladies dared not walk beyond the end of the street. Murder lurked behind every bush, and terror in every shadow. Every man's hand was against his brother, and every man considered, not the welfare of others, but his own.

Arthur looked with sorrow on this degraded land, but not with despair. He knew that there is, in all men, good to which a good man may always safely appeal. So he proclaimed a reign of justice and love; he cut broad roads through the dense forests, and called upon the strong to protect the weak, and bade every man who called him king to honor women and little children. The peasants rejoiced in these commands of their king, and the land once more began to smile under the hand of husbandry; but still there were many who loved violence for its own sake, and others who robbed and murdered because they hated to work.

At this time Arthur fell in love with the most beautiful princess in the world, Guinevere, only daughter of King Leodegran, who reigned in Cameliard. He told Merlin the Wizard of his great yearning for this exquisite lady, and Merlin was sad. Arthur questioned him about his sadness,

but Merlin said sorrowfully that it was in vain to try to turn the tide of a man's passion: Arthur must have his way; yet must evil needs come out of this marriage.

Arthur was too hot in love, and too flushed with the joy of his young kingship, to listen to these twilight warnings of the old man. Very joyfully he rode out to meet the lovely Guinevere, and at Canterbury, where the marriage was to take place, he made a great feast, and there he set up what is called the Round Table, and called to it all valiant and gentle men who would stand round their King and protect the weak and punish the tyrant. And chief among those at the King's side was the peerless knight, Sir Lancelot of the Lake, who had brought Guinevere to the King.

And this is the history of the Round Table. Merlin made it for Uther Pendragon, and at the death of Uther Pendragon it passed to King Leodegran, who held it in high esteem. But when Guinevere, his daughter, rode forth with Sir Lancelot of the Lake to marry Arthur at Canterbury, Leodegran sent to the young King this huge table which had once been his father's, as the next best gift he could give after Guinevere, his lovely daughter. And so Uther Pendragon's table became Arthur's table.

Now, at the marriage feast, when Arthur called brave men to his table, it was no mere act of amusement. With high pomp and gorgeous ceremony he called his knights. He made them as knights servants of Christ the King.

He bade them consider themselves as the soldiers of the Perfect Christ; and he explained to them his high and noble purpose, which was to rule Britain by his order of chivalry, by the Knights of his Round Table. They were to go forth, armed and vigilant; they were to ride up and down in the land punishing tyrants and evil men, helping the poor and needy, succoring the weak and defenseless, and turning the hearts of all men to Christ and the King.

Thus, in the good providence of God, Britain should have peace, and the blessings of Heaven light upon the lovely isle forever.

We wonder what the gracious and lovely Queen thought of King Arthur as he spoke to his knights, and as they one by one came and knelt before him. She must have admired his beauty; she must have felt the magic in his words; she must have seen the power in his soul; but did she feel love for him? Alas, this lovely Queen, smiling at Canterbury upon the first act of the King's chivalry, was to be its ruin and disgrace. She spoke her marriage vow: "I love thee to the death!" but the dream of the great King was to be shattered by her falseness. And through her woe fell upon the land.

Perhaps at that grand ceremony Merlin did not look either at the King or at his kneeling knights, but only at the Queen. Did their eyes meet, we wonder—the young Queen's and the old prophet's? And if so, did Guinevere flush and look aside, avoiding the eyes both of Merlin and of Sir Lancelot?

THE CHALLENGE OF THE KING

AND THE FIGHT WITH SIR PELLIMORE IN THE FOREST

SO gay and cheerful was King Arthur that he would often ride out alone and without kingly state into the forest, seeking an adventure after the manner of his knights, who went about redressing wrong.

And it chanced one day, as he rode in the forest Perilous, that he encountered a wicked knight who for the mere joy of fighting mounted guard over the path, permitting no man to go past. This wicked Sir Pellimore challenged the knight approaching him, and Arthur gave him battle, veiling his kinghood. The two horses crashed together, and both horsemen came to the ground. Sir Pellimore was mighty above every man at that time, and he splintered the King's shield and broke his sword. But Arthur rushed at him, and seizing him about the middle, hurled him to the ground. Yet did Sir Pellimore cling to him, and would have done him some harm if Merlin had not come and thrown him into a deep sleep. When he aroused and knew that he had fought with the King, Sir Pellimore was sore afraid. But Arthur forgave him, and accepted him as a Knight

KING ARTHUR AND HIS KNIGHTS

ENID AND GERAINT. FROM THE PAINTING BY ROWLAND WHEELWRIGHT

THE KNIGHTS OF KING ARTHUR. FROM A TAPESTRY DESIGNED BY SIR EDWARD BURNE-JONES AND MADE BY MORRIS & COMPANY

LANCELOT AND ELAINE OF ASTOLAT. FROM THE PAINTING BY SIDNEY PAGET

SIR TRISTRAM IS ADMITTED AS A KNIGHT OF THE ROUND TABLE. FROM A FRESCO IN THE KING'S ROBING-ROOM IN THE PALACE OF WESTMINSTER

SIR GALAHAD,
BY ALLAN STEWART

THE BEGUILING OF MERLIN,
BY SIR E. BURNE-JONES

SIR GALAHAD,
BY G. F. WATTS

THE PASSING OF ARTHUR. FROM THE PAINTING BY JAMES ARCHER

SACRED MYSTERIES AND SORROWS

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THE VISION OF THE HOLY GRAIL. FROM THE PAINTING, THE ROUND TABLE OF KING ARTHUR, BY EDWIN A. ABBEY

KING ARTHUR IN AVALON WHEN MORTALLY WOUNDED. FROM THE PAINTING BY SIR EDWARD BURNE-JONES

KING ARTHUR'S QUEEN, GUINEVERE, IN THE NUNNERY GARDEN.
FROM THE PAINTING BY MARY F. RAPHAEL

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of the Round Table, so that Sir Pellimore forsook his evil ways and fought only for the honor of Christ and the King.

The King went on with Merlin, and they came to a deep lake in the midst of the forest. And Merlin stayed the King, and they went to the edge of the water and looked across it. And as they looked a wondrous arm came from the centre of the lake, and in the hand was clasped a sword. Then Arthur saw a little boat by the lake, and Merlin bade him enter it and go out upon the water and take the sword. So Arthur did as the Wizard told him, and returned with the sword.

It was rich with jewels on the hilt, "bewildering heart and eye," and its blade so bright that men were blinded by it.

Then Merlin pronounced its name "Excalibur," and told Arthur that it was the mightiest sword on earth, and that upon the hilt was engraved on one side, "Keep me," and on the other, "Throw me away." Arthur's face was sad at taking it, but old Merlin thus counseled him, "Take thou and strike! the time to cast away is yet far off."

And this sword, in the hand of the King, became mightiest in Christendom, and its fame has lasted unto this day. Even now do poets sing about it.

No man could stand before Excalibur, and the glory of the King increased. Yet never once used he Excalibur in an evil cause, nor encouraged the brotherhood of his knights to love fighting save for noble ends.

And his knights were like, as it were, his apostles; they gathered unto themselves something of the glory of his soul, and carried chivalry into all the length and breadth of Britain, so that there was no land so honored and so happy as Britain, and no knights in all Christendom so famous for pure lives, great valor and exceeding courtesy as King Arthur's Knights of the Round Table. Gloriously in those days did the sun shine upon the green fields and the waters of Britain.

THE VISION OF SIR GALAHAD

AND HOW THE YOUNGEST OF THE KNIGHTS FOUND THE HOLY GRAIL

NOW, the knights of King Arthur had each one his own seat at the Round Table, and on every seat the name of the knight was carved.

But there was one seat called the Perilous, which had no occupant, none daring to sit in it, and over the name which no man knew, there was always a covering.

One day, as the King and his knights sat together, there entered the great hall an aged knight, followed by a most beautiful young man. The old knight advanced to the seat called Perilous, and pointed to the young man that he should sit there. When his command was obeyed, the old man bent over the youth, kissed him, and departed.

Much amazed was the King, and asked the young man his name.

"I am called Galahad," said he.

Then the King raised the cloth on the seat, and lo! the name written there was "Galahad."

Now, Galahad was the youngest of the knights, and not so strong a man as the others; but there was such majesty in his eye, such purity in his brow and such sweetness on his lips that the others felt for him a great reverence, and he was treated even by the King with high honor.

One evening as the knights sat together, the King being absent, a good and happy young knight named Sir Percivale entered the hall with a wonderful story.

He had been to see his sister, who was a nun, and this sister had told him how one night as she lay sleeping in her cell she was suddenly awakened by most sweet music, and opening her eyes, saw a broad shaft of moonlight streaming through her window, in the midst of which floated and throbbed like a beating heart the sacred chalice out of which our Savior drank the wine at the Last Supper—the sacred cup, called by all men the Holy Grail.

The knights started up at the tale. This Holy Grail, so ran the legend, had been brought to England by that good Joseph of Arimathea who laid our Savior in the sepulchre from which He rose triumphant on the Christians' first Easter Day.

The Holy Grail had once been venerated in England, but suddenly it had

KING ARTHUR
He rode a simple knight among his knights,
And many of these in richer arms than he.

vanished—some said because of the evil in the land—and after searching for it up and down the kingdom for a long time men at last had ceased to think about it. But now the vision had appeared again.

Among the knights to whom Sir Percivale's story came with great power was Sir Galahad. His face made clear how deeply he was moved. Sir Percivale, looking upon him, saw that the expression in Sir Galahad's eyes was like that which he had seen in the eyes of his sister, and it came to him that Sir Galahad should go and see the nun, and speak to her about the Holy Grail. If any man was to find the Cup, it might well be this pure and noble youth.

So Sir Percivale took Galahad to the place where his sister lived, and as soon as the nun saw Galahad she knew that he was to be Knight of the Holy Grail. Then the beautiful nun cut from her head all the lovely hair that adorned it, and made a girdle of these gleaming tresses, and bound it about Sir Galahad's waist, and fastened his sword to it, and charged him with the holy mission. He was to pray often; he was to go forth doing good, and after the vision of the Holy Grail was vouchsafed to him, he was to journey to a far-off city where the people would crown him king.

Sir Galahad obeyed the nun. He was not the only knight who went forth in quest of the Holy Grail, for the story of the nun had fired the imagination of all the knights of King Arthur's court, and Britain now witnessed the dispersal of these brave men in quest of the sacred Grail. But Galahad was the only knight whose heart was pure, and it was to Galahad that the vision came.

On his long journey he fell in with his old friend Sir Percivale, and Sir Percivale confessed that not yet, in spite of

fastings and prayer, had he seen the blessed vision. Then Galahad told Percivale how the vision was always before him, and how it had led him from victory to victory, and how no man could stand against his spear.

"But you, too, shall see the vision," he concluded, "for I am about to go to a far city, and at the moment of my departure you shall see the Holy Grail."

The two knights traveled forward on their horses. Sir Galahad carried on his left arm a white shield with a scarlet cross, and his great war-horse, with its crisping mane and long, flowing tail, was as white as milk. They rode silently, as men engaged upon some absorbing quest. Sir Galahad's eyes gazed straight before him, with a strange light in them. Sir Percivale glanced often at Sir Galahad. He was like a man who had looked upon the face of Christ.

Toward nightfall they reached the wide-stretching marshes, and heard in the far distance the roll of the surf. As they urged their horses into the gloom overhanging the marshes they saw rising up before them, and stretching forward on pier after pier to the well-nigh invisible ocean, a vast and towering bridge. Sir Galahad's eyes lighted at sight of this bridge, a smile illumined his pale face, and with one bound he was upon the bridge and clattering upward and forward.

Sir Percivale reined in his horse. He dared not follow. For as Sir Galahad reached the first pier it sent up into the night-sky a tongue of scarlet flame, and the second pier did the same, and the third, till the whole bridge over which Sir Galahad had passed was a great, sweeping mass of fire. Thrice above him the heavens opened and blazed with thunder such

Painted by G. F. Watts, R.A. Photo, Frederick Hollyer.

SIR GALAHAD

His strength was as the strength of ten,
Because his heart was pure.

as seemed the shouting of all the angels. But Sir Percivale, waiting in the darkness on his startled horse, had his reward. Just as Galahad reached the sea the whole sky was filled with the anthem of heaven; a mighty city of pearl-white towers and pinnacles disclosed itself above the ocean. And over this city into which Sir Galahad was entering, swimming in a mist of everlasting beauty, appeared the Holy Grail, mystic, wonderful.

Sir Percivale bowed his head upon his breast, and in that moment, so sacred, so wonderful that no language can describe it, vowed his life to the service of God and the love of Christ.

THE PASSING OF KING ARTHUR

AND THE BREAK-UP OF THE TABLE ROUND

THERE are many other stories of King Arthur's knights, and these you may read in books; but here we have room only to tell the end of the Round Table. For this gracious order of chivalry, which was like a parliament ruling Britain in a goodly manner, so that no man dare play the tyrant and none oppress the poor and the weak, came to an end, and the unwitting cause of it was Queen Guinevere, the loveliest lady in Christendom.

This beautiful lady could not keep her thoughts from dwelling much on Sir Lancelot of the Lake, who was the handsomest, the strongest and the most courteous of all King Arthur's knights, and Arthur loved him as a brother. So great was Arthur's love that when evil men, who hated Lancelot, tried to make him think that Guinevere loved the knight more than himself, Arthur was very wroth. But these evil men bided their hour, and one day when Lancelot was alone with the queen they came in a great number and made an uproar at the door of the queen's chamber, crying: "Treason! Treason!" So Lancelot, after slaying many of them, had to flee, and Guinevere—against the king's will—was tried for treason, and was ordered to be burned as a traitor to the king.

As she stood bound to the stake, and the flames began to rise around her, Lancelot rode up, slew those about her and before her, and carried her off. He had saved her, but she could not be his, for Lancelot loved honor. So he took her to an abbey, where she gave up all her life to prayer and holiness, and there the greatest knight of Christendom parted from the lovely queen. After that Lancelot retired to Gaul. Then the brother of one whom Lancelot had slain forced the heart-broken Arthur against his will to make war on Lancelot. They fought in Gaul, and Lancelot gave orders that none should hurt the king, and as often as he saw Arthur dismounted, he himself went to his rescue. Many times in the midst of this fierce battle the two great men looked into each other's eyes and exchanged words of love and courtesy.

Afterward Arthur returned to Britain, for his kingdom was in an evil state, and there was a great war in the West. The story of Lancelot and the queen had been a poison in the land, and men forgot honor and courtesy, and became like beasts. It seemed as if all the king's noble work was undone. The ideals of kindness and chivalry which had given peace, glory and virtue to the land were now mocked at as make-believe and foolish notions. The strong trampled on the weak. Few cared for honor. There was none to help the weak and oppressed. Sad and heart-broken was King Arthur, who had lost his queen, his favorite knight, and now his kingdom. But he fought in the West boldly for Christ and righteousness, as one who would never surrender; and there was he wounded to the death.

Now, when he was wounded, he called upon Sir Bedivere to carry him to a little church by the seashore; and Sir Bedivere wept, but Arthur comforted him. Then said the king:

"Take now my sword Excalibur, and hasten thee to the side of the water, and fling it into the deep." And Sir Bedivere went away. But the beauty and fame of the sword tempted him, so that he hid it, and returned to the king with a lie. But the king knew that he lied and sent him a second time. Yet a second time did Sir Bedivere lie, and the king sent him a third time. Then Sir Bedivere returned for the last time, and this time when the king asked:

"What sawest thou?"

"I saw," answered Sir Bedivere, "a

hand rise from the water, and as the sword hurtled toward the waters the hand caught it by the hilt, and brandished it thrice in the air, and afterward drew it down under the water."

"It is well," said the king.

Then he commanded Bedivere to carry him to the water's edge. As they reached the shore a great barge came to them, wherein were three queens, all in black with crowns upon their heads. And the queens received the king into the barge, and the barge drew slowly away across the darkening sea.

And the last words of King Arthur came faintly across the waters to Sir Bedivere, left kneeling on the shore: "Pray for me."

In his Idylls of the King, Tennyson describes his passing thus:

Then saw they how there hove a dusky barge,
Dark as a funeral scarf from stem to stern,
Beneath them; and descending they were 'ware
That all the decks were dense with stately forms
Black-stoled, black-hooded, like a dream—by these
Three Queens with crowns of gold. . . .
. . . . . .

Then murmur'd Arthur, "Place me in the barge."
And to the barge they came. There those three Queens
Put forth their hands, and took the King, and wept.
But she, that rose the tallest of them all
And fairest, laid his head upon her lap,
And loosed the shatter'd casque, and chafed his hands,
And call'd him by his name, complaining loud,
And dropping bitter tears against his brow
Striped with dark blood: for all his face was white
And colourless, and like the wither'd moon
Smote by the fresh beam of the springing east;
And all his greaves and cuisses dash'd with drops
Of onset; and the light and lustrous curls—
That made his forehead like a rising sun
High from the dais-throne—were parch'd with dust;
Or, clotted into points and hanging loose,
Mix'd with the knightly growth that fringed his lips.
So like a shatter'd column lay the King;
Not like that Arthur who, with lance in rest,
From spur to plume a star of tournament,
Shot thro' the lists at Camelot, and charged
Before the eyes of ladies and of kings.

Then loudly cried the bold Sir Bedivere,
"Ah! my Lord Arthur, whither shall I go?
Where shall I hide my forehead and my eyes?
For now I see the true old times are dead,
When every morning brought a noble chance,
And every chance brought out a noble knight.
Such times have been not since the light that led
The holy Elders with the gift of myrrh.
But now the whole ROUND TABLE is dissolved
Which was an image of the mighty world;
And I, the last, go forth companionless,
And the days darken round me, and the years,
Among new men, strange faces, other minds."

And slowly answer'd Arthur from the barge:
"The old order changeth, yielding place to new,
And God fulfils himself in many ways,
Lest one good custom should corrupt the world.
Comfort thyself: what comfort is in me?
I have lived my life, and that which I have done
May He within himself make pure! but thou,
If thou shouldst never see my face again,
Pray for my soul. More things are wrought by prayer
Than this world dreams of. Wherefore, let thy voice
Rise like a fountain for me night and day.
For what are men better than sheep or goats
That nourish a blind life within the brain,
If, knowing God, they lift not hands of prayer
Both for themselves and those who call them friend?
For so the whole round earth is every way
Bound by gold chains about the feet of God.
But now farewell. I am going a long way
With these thou seëst—if indeed I go
(For all my mind is clouded with a doubt)—
To the island-valley of Avilion;
Where falls not hail, or rain, or any snow,
Nor ever wind blows loudly; but it lies
Deep-meadow'd, happy, fair with orchard lawns
And bowery hollows crown'd with summer sea,
Where I will heal me of my grievous wound."

So said he, and the barge with oar and sail
Moved from the brink, like some full-breasted swan
That, fluting a wild carol ere her death
Ruffles her pure cold plume, and takes the flood
With swarthy webs. Long stood Sir Bedivere
Revolving many memories, till the hull
Look'd one black dot against the verge of dawn,
And on the mere the wailing died away.

But when that moan had past for evermore,
The stillness of the dead world's winter dawn
Amazed him, and he groan'd, "The King is gone."
And therewithal came on him the weird rhyme,
"From the great deep to the great deep he goes."

THE NEXT STORIES ARE ON PAGE 6997.

FRENCH—THE LITTLE VISITOR

First line, French; second line, English word; third line, as we say it in English.

Un jour quelque chose s'abattit sur la fenêtre de la salle d'étude.
One day some thing itself fell upon the window of the room of study.
One day something flew in at the schoolroom window.

Les enfants sautèrent. "Regardez!" s'écria Ethel. "C'est une petite grive."
The children jumped. "Look!" herself cried Ethel. "This is a little thrush."
The children jumped up. "Look!" cried Ethel. "It is a little thrush."

"Essayons de l'attraper," dit Guillaume. L'oiseau était sur les rideaux.
"Let us try of her to catch," said William. The bird was upon the curtains.
"Let us try to catch it," said William. The bird was on the curtains.

Il essaya de l'atteindre, mais il était trop petit. Il réfléchit un moment.
He tried of it to reach, but he was too little. He considered a moment.
He tried to reach it, but he was too short. He thought a moment.

Guillaume mit une chaise sur la table, monta dessus, et étendit la main.
William put a chair on the table, mounted upon, and extended the hand.
William put a chair on the table, climbed up, and put out his hand.

L'oiseau ne bougea pas. "Pauvre petite grive!" dit-il. "L'aile est blessée."
The bird (not) stirred not. "Poor little thrush!" said he. "The wing is hurt."
The bird did not move. "Poor little thrush!" said he. "Its wing is hurt."

"Laisse-moi le voir," dit Ethel, courant à la table et étendant la main.
"Let me him to see," said Ethel, running to the table and extending the hand.
"Let me see it," said Ethel, running up to the table and holding out her hand.

"Nous le mettrons dans une cage et le soignerons." "Quelle bonne idée!"
"We it will put into a cage and him will care for." "What good idea!"
"We will put it in a cage and take care of it." "What a good idea!"

Aussitôt que le petit oiseau fut tout à fait bien il désirait de nouveau la liberté.
As soon as the little bird was all to made well it desired again the liberty.
As soon as the little bird was quite well it wanted to be free again.

Les enfants ouvrirent la porte de la cage et l'heureuse grive s'envola.
The children opened the door of the cage and the happy thrush herself flew away.
The children opened the cage door and the happy thrush flew away.

THE NEXT FRENCH STORY IS ON PAGE 7248.

HOW TO SWIM AND DIVE

CONTINUED FROM 6786

SWIMMING is one of the healthiest and most enjoyable of sports. The ability to swim may enable any boy or girl to perform that greatest of all deeds—the saving of a human life.

It is quite possible for us to teach ourselves to swim, especially if we are confident, but we shall learn much more quickly if we have a friend or parent who can give us a helping hand. Water is quite able to support our weight, and we can easily prove how buoyant it is by standing with it up to our waist and trying to touch our toes. It is almost impossible to do this, because of the lifting power exerted by the water.

For our first attempt let us walk out into the sea or pool until the water reaches just above our waist. Turning toward the shore, we should ask a companion to put one hand under our chin and the other hand under our body. Thus supported, we must hold our head well back, close our mouth, and breathe only through our nostrils. It is, perhaps, best at first to work our arms only, so that we can fix our attention on them alone, letting our legs remain stretched out stiffly. Keeping our fingers and thumbs close together, and placing both hands just under our chin, we push our hands out as far as we can, thumbs touching, palms downward, and the backs of our hands very slightly curved, just under the surface of the water. We then turn our palms outward, and bring our arms round in a wide and strong sweep until they are in a straight line with our body. Next we bend our elbows, bring them to our sides, and place our hands in front of our chest ready for the next stroke. This movement is easily mastered, and we can now turn our attention to the leg-stroke. In order to do this accurately, we first gently draw both legs toward our body, the backs of our heels touching, and our knees and toes pointing outward; the soles of our feet should be just covered by the water. We then kick both feet out strongly at an angle to our body, so that at the finish of the kick our legs are quite wide apart, and, without pausing, we bring both legs quickly together, being careful not to bend our knees. It is mainly this last movement that drives us along, and our companion will soon find it necessary to walk along beside us. We must not hurry in striking out with our hands and drawing up our legs, as these are negative movements. Our legs should be drawn up as our arms are swept round, and kicked out as our arms are pushed forward. The breath should be taken in when our arms are wide apart. In kicking out, the best swimmers give their legs a kind of twist or screw.

We must next learn to swim on our back. This is most important, as it is one of the ways by which drowning or unconscious persons are brought to land. It is, too, the least tiring method, and in long swims in deep water, if we turn and swim on our back it will enable us to rest our muscles and lungs. The stroke is very similar to the breast-stroke, only we lie on our back. A companion may assist us by placing his hand under the hollow of our back, but if we can swim easily on the breast, we shall not need help. Stretching our arms to right and left, we must lean back on the water and lift our feet off the ground. Our legs will come readily to the surface if we keep our head well back with our ears under the water, and, if we lie quietly, we shall find that we will not sink. To move along, however, we bring our hands to our sides. Both arms are then brought out of the water in a circular sweep, and placed in the water as far behind our head as we can reach. Our thumbs should touch in per-

forming this movement, and our hands should turn so that as they enter the water the backs of them meet. Our palms are then ready to present as large a propelling surface to the water as possible when our arms are brought in a wide and powerful circular sweep just under the surface, until they lie straight along each side of the body. Our legs are brought up and kicked out just as for the breast-stroke. Should our arms get tired, they can be folded on the breast and our legs alone worked, the breath being taken during the finish of the kick-out.

THE SIDE-STROKE AND THE OVERARM STROKE

We now come to the side-stroke and the speedier overarm stroke. Turning on our right side, we push out our right arm in a straight line with our body, our fingers and thumb being closed and at right angles to the surface. Our palm is then turned outward and our arm is pulled down strongly, without our elbow being bent, until it points to the bottom. Our arm is then drawn in to our body by bending our elbow and turning our wrist inward, and moved along in front of our chest until it is in a position to push out again from just under our ear. Our left, or upper, arm moves alternately in the same way, but our hand cannot go so deep, and our elbow must be bent slightly, otherwise our body would roll forward. ' The only difference in the movement of our arms in overarm swimming is that our left arm is brought right out of the water and dipped slightly farther in front of our head than our hand reaches when it is not taken out of the water. Our breath should be taken when our head rises well out toward the finish of this stroke, and it can be expelled quite easily when our head is under the water and our arm swung over.

There are at present two forms of leg-stroke used in swimming on the side. In the older method both legs were drawn up under the body and kicked out widely, as in the breast-stroke. In the newer method, now adopted by most good swimmers, the knee of the upper leg is bent but little; that is to say, the left foot is never drawn up, but kicked slightly forward. The heel of the under leg is brought back toward the body. Both legs are then brought sharply across each other as in walking, the left leg being straight as it passes the straightened right leg, and not being bent back until it has again crossed the right leg. It is well to practice swimming on both sides.

Some swimmers give a kick for each stroke of the arm, but this is very tiring; and it is perhaps best to kick every time a stroke is made with the stronger arm, taking in breath when the head is well above the water.

THINGS FOR THE LEARNER TO AVOID

There are certain things that we must not do in bathing. We should on no account enter water beyond our own depth until we can swim at least fifty yards without a rest. In learning we must not depend on cork belts, bladders or water-wings, as these would prevent our body from taking its natural position in the water. They have been known to slip, and thus cause the wrong part of the body to float and the head to sink. We must not hurry our strokes in learning. It is quite surprising how slowly we can take our strokes and make good progress. We should never bathe within half an hour after a meal, or at any time when very hot, very cold, or very tired.

HOW TO DIVE GRACEFULLY

Diving is a valuable and graceful accomplishment for the swimmer. If we see a person drowning, we might always go over the boat or pier feet first, but by arriving in the water head first and arms out we can more easily and quickly take our first stroke. We must learn to keep our feet together, and our legs, body, head and arms in one straight line, as we enter the water. Our thumbs should be locked and the backs of our hands uppermost. We come to the surface of the water by raising our arms upward. When standing on a diving-board our toes should project over the edge, and the spring is taken from the balls of our feet.

Diving, like swimming, demands that the novice first master certain fundamental elements. Briefly stated, there are five essentials to be observed, which apply to diving from the 3-foot board or the 10-foot board, the two standard heights for fancy diving.

1. *The Starting Position.* This is a position of "Attention" on the lower end of the board.

2. *The Approach.* This should be made in a bold, confident manner.

3. *The Take-off.* This is accomplished with a fairly high jump on to the end of the board and the spring made from both feet, combined with a shoulder lift so that a maximum of height may be attained.

4. *Form in the Air.* This is the most important part of the dive. As the diver leaves the board, the back should be arched, the head well back and the toes pointed.

5. *Entry into the Water.* In all dives the position of the head goes a long way toward regulating the movement of the body while in the air.

There are several forms of fancy diving to learn. The running front dive should be learned as follows:

From a run the take-off is made from both feet; the spring should be upward rather than outward; simultaneously with the body lift, the arms are placed in position at right angles to the body and held outstretched for an appreciable time. On entering the water the hands must be together, body arched, and legs held straight with toes pointed.

Another fancy dive, known as the front jack-knife, is accomplished as follows:

The take-off is the same as in the front dive, but the lift is mainly from the hips. The "jack" position, that is, body bent at hips, with hands touching the legs below the knees, should be held momentarily; on the opening, the position for the entry is the same as in the front dive.

It is a good practice not to dive into water of unknown depth, as serious injury may result. Sometimes it is difficult to tell the depth from above; then swimmers should not dive in.

FORWARD PLAIN AND SWAN DIVES

The forward plain, or running front, dive is the easiest of all the dives. The take-off is from both feet, and the body is shot upward rather than outward by the spring. The entry to the water is made at an angle, as shown here. The hands must be together, body arched, and legs held straight with toes pointed.

The boy in this picture appears to be flying, so graceful is his position in midair. This is the famous swan dive. It is begun like the forward plain, but the position of head and arms is changed as shown here.

Photos on pages 6957 and 6958 by L. de B. Handley.

THE WAY TO DO THE CRAWL

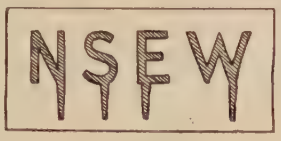
The position of the body in all types of crawl is that shown in this picture. Here we see the start of the arm dive (left arm leading) while the legs are performing a narrow thrash.

As the left arm, slightly bent, comes down in the water the right arm is getting ready to strike out. The face is under the water.

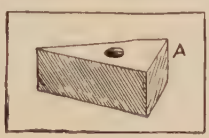
In the third position the left arm has finished its stroke and is ready to come out of the water to start again. The right arm is prepared to stroke out. The face is turned so that the mouth is above water.

AN EASILY MADE WEATHER-VANE

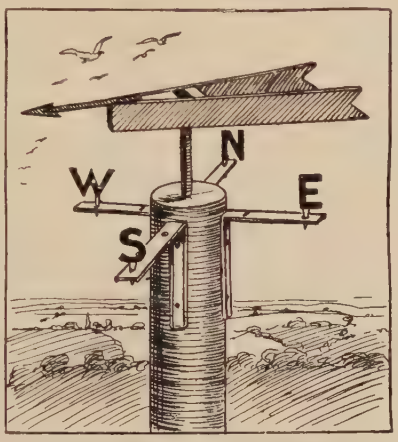
EVERY one of us can erect a weather-vane in our garden with very little trouble and at scarcely any expense. We obtain a fairly stout pole or post, straight, but whether square or round in shape does not matter at all. We then screw on to the post, at right angles to each other near the top, four iron right angles such as can be bought at any hardware store for a few cents. These are to indicate the four points of the compass. With a fretsaw we cut out four wooden letters, N, S, E and W, with an arm underneath each as shown in picture 1. This arm is, in each case, to insert into the screw-hole that is always found in the iron angles that we buy at the hardware store. We must therefore have the arm wide enough to fit tightly into the hole of the iron angle. It can be kept perfectly firm in the hole by inserting a small piece of wood on each side of it in the hole.



1. The letters.

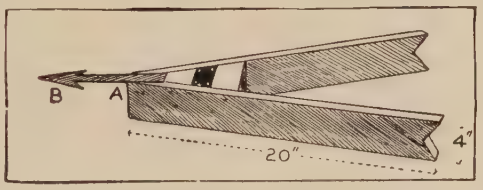


2. The wedge.



3. The weather-vane in position.

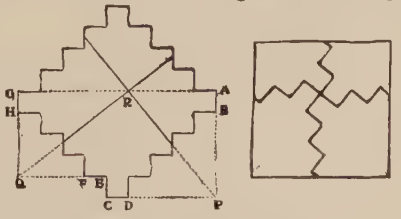
Now we must make a hole in the top of the post, and firmly insert an iron rod about ¼ inch in diameter. This rod should be roughly pointed at both ends, and could be obtained from a blacksmith. The pole is now ready, and should be erected in the garden at a spot that is open to the winds from all directions. A sheltered spot is quite useless for a weather-vane. In erecting the post we should dig a hole about 3 feet deep, insert the post, and then fill in the earth, pressing it down tightly. On the ground immediately round the post we should stamp in some gravel, as this will help to tighten the hold of the earth on the post. If we want additional security in fixing up our post, we can, of course, get some cement from a builder and mix this with water, placing the wet cement in the hole all round the post. When it dries, the cement will hold the post very firmly. Now we make the weather-vane itself. We take a wedge-shaped piece of wood as shown in picture 2, and bore a hole right through it of a diameter large enough for it to turn quite easily and smoothly on the iron rod at the top of the post. Then we nail across this hole at the top of the wedge a piece of sheet-iron, so that, when the wedge is slipped on the iron rod at the top of the post, the rod will not go right through. On each side of the wedge we screw a piece of ¼-inch board, 4 inches wide by 20 inches long, as in picture 4, and where they meet at the point *A* join them nicely; and bevel to a sharp angle. A metal or wooden arrow may be cut or sawed out and screwed on to the vane to act as the pointer *B*. We lift the vane on to the rod at the top of the post, fitting the rod into the hole in the wedge, and our weather-vane is quite complete and ready for use. Of course, in erecting the post in the garden we must see to it that the N, S, E and W point actually to these different points of the compass. A small pocket-compass, costing a nickel, may be used to guide us in doing this quite correctly.



4. The weather-vane ready for the post.

SOLUTION OF THE SQUARE PUZZLE

WE read on page 6780 how Kenneth was offered a prize by his father if he solved a curious puzzle. He tried for a long time before he could do it, but just before bedtime came he was successful, and his father was very pleased. If we wish to do what Kenneth did, this is how we must proceed: Prolong the lines *AB* and *CD* to meet at the point *P*; and also the lines *EF* and *GH* to meet at *Q*. Then, along the line *AG*, measure *AR* equal to *BF*. If we now cut along the straight lines *PR* and *QR*, we shall have four pieces which fit together into a square, as shown in the second diagram. The original figure was built up of rows of squares, beginning with a row of nine. The puzzle is solved in exactly the same way if we begin with a row containing any *odd* number of squares, the successive rows each containing two squares fewer than the previous row, so that we always arrive at a single square top and bottom. It is really very simple.



How the square was made.

AMERICAN FOOTBALL

DURING the autumn months of every year thousands of boys and young men in the United States play football. It is the favorite sport in colleges and high schools, and the newspapers print long accounts of the games, some of which are attended by many thousands of spectators.

It is a rough game and a boy who is not strong should not attempt to play it. Even strong boys are sometimes hurt, and, therefore, some parents and some schools object to the game, and do not allow their boys to play. However, if only strong boys, wearing proper clothes, play the game, there is not much danger of serious injury. Players should always wear regular padded football clothes, and strong shoes which fit closely around the ankles. Nose-guards made of rubber and shin-guards are often worn, but are not absolutely necessary.

Football is a very old and very widely played game. Several thousand years ago, we know, it was played by the Greeks. Through the Romans it was passed on to the Britons. The English gave it to the United States, where it has developed into a game distinct from any played elsewhere.

The American Intercollegiate game, played by nearly all of the colleges and most of the schools, is played upon a rectangular field, 360 feet long and 160 feet wide, inclosed by white lines marked on the ground. Two lines, 300 feet apart, are called the goal-lines. In the middle of each of these is erected a goal, consisting of two upright posts 20 feet high and 18½ feet apart, with a horizontal crossbar 10 feet from the ground. Parallel with the goal-lines, white lines run across the field 5 yards apart, and these lines give the field its familiar name of gridiron. These are the official dimensions. In games between teams of boys, however, the field is often smaller, depending on the space available; and the 5-yard lines, which are merely an aid to the referee in judging distance, are usually omitted.

The ball is an inflated rubber bladder, with a leather cover, usually made of pigskin. It is not round, but drawn out lengthwise into rounded points at opposite ends, to make it more easily handled. The game is played by two sides of eleven men each. Seven of these men are forwards, who form the rush-line, and they take positions beside one another, facing the goal-line to be attacked, as shown on the diagram. The man in the middle is called the centre. At each side of him stands a guard; outside of the guards come the tackles; and outside of these, the ends. The remaining four men compose the backfield. Of these, the quarterback stands directly behind the centre; two halfbacks take their positions at the sides of, and a little farther back than, the quarter. Still farther to the rear, and behind the centre of the line, is the fullback's place. This is, in general, the arrangement of the men when in possession of the ball and lined-up for an attack. When on the defense, while the linemen keep their positions, the backs shift to meet different plays by their opponents, sometimes playing far to the rear in readiness to receive a kicked ball. Because they take so many different positions, we do not show the defense on the diagram.

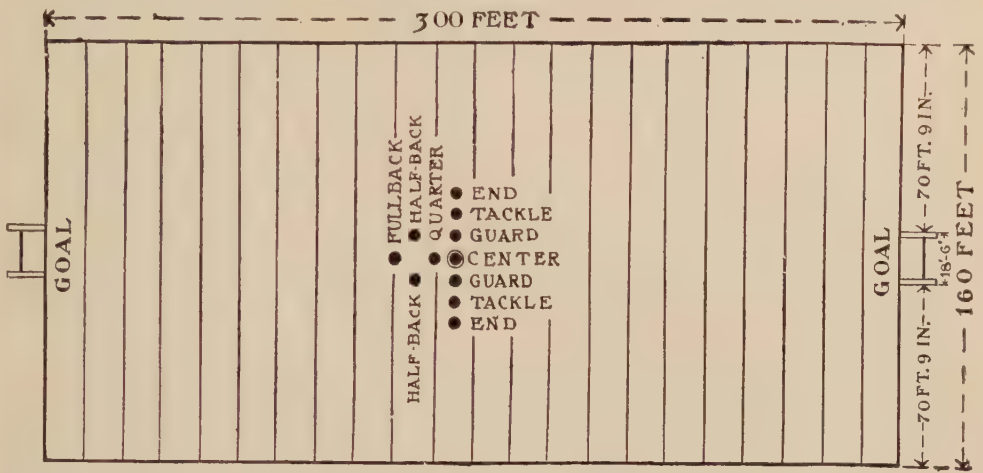
The standard length of time of a game is sixty minutes of actual playing. This is divided into four periods called "quarters," of fifteen minutes each. Between the first and second quarters, as well as between the third and fourth, there is an intermission of one minute. The period of rest between the second and third quarters lasts fifteen minutes.

Scoring is accomplished in two ways: by touching the ball down behind the goal-line, or by kicking it over the crossbar of the goal. When a player succeeds in carrying the ball across the opposing team's goal-line and there touches it to the ground, it is called a *touchdown*, and counts six points. When a team has made a touchdown, the ball is brought out into the playing-field, and one of the men of that side tries a *place-kick*, that is, kicks the ball from the ground where it is held in position by one of his team-mates. If the ball passes over the crossbar, it is called a *goal from touchdown* and adds one point to the score. A *field-goal*, which counts three points, may be made without having scored a touchdown, by sending the ball from the playing-field over the crossbar, by means of either a place-kick or a *drop-kick*. A drop-kick consists in dropping the ball from the hands and kicking it just as it begins to rise from the ground. When any member of a team is forced to carry the ball behind his own goal-line and there touch it down, his team is said to make a *safety*. This counts two points for its opponents. If, however, a team recovers, behind its own goal-line, a ball kicked across *by the opposing side*, a safety is not counted. This is called a *touch-back;* it does not add to the score. After a touchback, the defensive side has the privilege of putting the ball in play by a scrimmage anywhere on its own 20-yard line. Formerly it had the choice of putting the ball in play by a scrimmage or by kicking it from behind that line.

The two captains having decided the choice of goals and kick-off by tossing a coin, play begins with a kick-off from the kicker's 40-yard line. The players of this side line up even with the ball. One of their number, after a short run, kicks the ball into the territory of the enemy, who have scattered about their half of the field in readiness to receive the kick. The man who catches the ball starts on a run toward the hostile goal, protected as much as possible by his comrades, and striving to evade his opponents, who have come charging down the field as soon as the ball has been kicked. If the runner succeeds, by dodging, in making his way through the ranks of his opponents and crosses their goal-line, he has scored a touchdown. Usually, however, he is tackled and thrown. When his course is thus arrested, the ball is said to be *down*. In that case, the ball is given, at that spot, into the charge of the *centre* of the runner's side. His team-mates line up at the sides of the centre on a line even with the ball and parallel with the goal-line in the manner described before when speaking of the players. Opposite them, their

antagonists line up. Both sides are now ready for a *scrimmage*. At the signal, the centre snaps the ball to the quarterback, who passes it to the man in the backfield who has been called on to advance the ball by *rushing*. The rusher tries to carry the ball either through the line or around one of the ends. When he has been stopped, the ball is said to be *down* for the second time. Four such *downs* are allowed, in which to make a gain of 10 yards. When 10 yards have thus been gained, it is again called first *down*. Thus, the team continues its progress toward the enemy's goal, unless it either loses the ball on a fumble, or fails to gain the required 10 yards in four tries. When a team perceives that it will not make the necessary 10 yards in its four downs, the practice is not to rush the ball on the last down, but to kick it so as to place it as far away from their goal as possible. In either case, the ball comes into the possession of the other side, which now makes its attack in a similar way. A *forward-pass* may be made from scrimmage formation by any man in the backfield, and may be received by an *end*, or by any man who was in the backfield when the ball was put in play. Such a pass may be intercepted by any opponent.

Regarded as *fouls* and forbidden are: offside play, that is, getting in front of the ball; holding or tackling anyone but the man with the ball; tripping, striking, or kicking a man; "piling up" on a "downed" player. Boys who wish to play the game in earnest should get the book of rules and study them, and better still, get some person who knows the game to teach it to them. Football is hard to learn from a book.



The field laid out for football.

In Canada three different kinds of football are popular. There are Canadian Rugby, English Rugby and Association, or Soccer, football. The intercollegiate teams play Canadian Rugby, a game which is somewhat similar to the American game, but rather favoring more open play.

AN EASILY MADE SHELTER

IF we are out scouting or camping, and wish to make a shelter quickly in which we can sit and rest, at the same time being shielded from wind or rain, this can be done quite easily. We stand three branches together in the same way as soldiers stand their rifles when they are resting, and, of course, if the ends of these branches are forked, they can be supported against one another all the more securely. Then, leaving an opening in front, as seen in the picture, we pile up small branches and brushwood round the uprights, pressing them closely together, until we have a shelter like that shown.

The shelter complete.

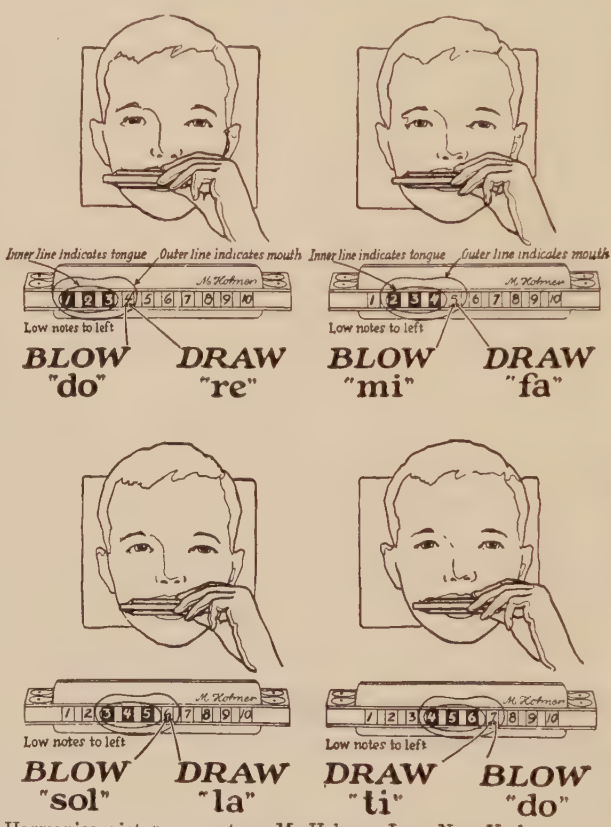
By sitting in this we can get protection from rain and wind, provided, of course, that we make the opening face the direction opposite to that from which the wind is blowing. Another way to make use of branches and brushwood if we are caught far from camp on a canoeing trip is to draw up the canoe and tightly pack it with soft leafy branches, leaving only enough space for the body. Great warmth can be thus obtained. In open country and wooded districts, branches and brushwood are always accessible, and to build a shelter like this is the work of a very few minutes. It is also very useful as a shady nook.

A clever boy can, from this picture, get an idea for a little shelter that is well worth building as a permanent resort in the garden. If straight branches be selected to pile up against the uprights, and they be fastened with tarred string, a little summer-house will be formed that will prove useful and at the same time, so far from looking unsightly or crude, will have a neat, rustic appearance.

HOW TO PLAY THE HARMONICA

FOR the first lesson in harmonica-playing select an instrument having 10 single holes with 20 reeds (10 blow reeds and 10 draw reeds). The harmonica should be held in the left hand and placed to the mouth, between the teeth, with the low notes at the left. In so doing, the lips should cover only four holes. In that position place the top or surface of the tongue (¾ inch back from the tip) firmly over the first three holes. Blow lightly through the fourth hole and the sound of only one note or reed will respond. If more than one note responds, the tongue has not been properly placed on the instrument. Repeat this exercise until you have mastered the blowing of this one note, for in order to become a proficient player the proper placing of the tongue on the harmonica is absolutely necessary.

The graphic chart on this page clearly pictures the proper position of the mouth and tongue on the harmonica when playing the scale. The chart illustrates the playing instructions for any single-hole Hohner harmonica, regardless of the key in which it is tuned. The fourth blow note (low notes at the left) on the Hohner harmonica is the "do" note of the scale. When you have succeeded in blowing the fourth note or "do" distinctly, draw your breath through the same hole and you will have the second note of the scale, or "re." Now move the mouth one hole to the right, covering three left holes with the tongue as before. Then blow and you will have the next note of the scale, or "mi." Draw your breath through the same hole and you will produce the fourth note, or "fa." Again move the mouth one hole to the right and blow and you will have the fifth note of the scale, or "sol." Then draw and you will get "la" or the sixth note of the scale. Move the mouth once more to the right and draw, thereby producing the seventh note, or "ti," and then blow and you will get the last note which is high "do."



Harmonica pictures, courtesy M. Hohner, Inc., New York.

1. How to hold the harmonica to play the scale.

Practice this scale continually until you can run up and down on the harmonica with increasing rapidity. When you can play the complete scale properly, you will have virtually learned to play the harmonica, for it will then be easy to play any song that you know by ear, or from the notes, if you can read music.

A popular selection for beginners on the harmonica is Home, Sweet Home, and as a guide in playing this melody the simplified system of letters and numbers will prove helpful. It is easy to put numbers to notes.

The numbers refer to the holes of the harmonica as they run in rotation from left to right. For example, 1 refers to the first hole; 2, the second hole; 3, the third hole; and so on. The letter B indicates that you are to blow into the holes so designated, while the letter D means that you are to draw. The combination B 4, for example, indicates that you are to blow into the fourth hole; D 4 means draw through the fourth hole; B 5 means blow into the fifth hole; D 5 means draw through the fifth hole, and so on as the numbers and letters indicate.

While you are following these instructions, carry the tune in your mind so that you will know just how long to hold each note, thereby "keeping time," as it is termed in music. If you do not read music, it will be necessary to play the harmonica "by ear" or from memory.

Now, bearing in mind what has been said about the letter and number guide let us play Home, Sweet Home.

Mid pleas-ures and pal-a-ces though we may roam,
B D B D D B B B B B D B D D B
4 4 5 5 5 6 6 5 5 6 5 5 5 4 5
Be it ev-er so hum-ble, there's no place like home!
B D B D D B B B B D B D D B
4 4 5 5 5 6 6 5 6 5 5 5 4 4
A charm from the skies seems to hal-low us there,
B B B D D B B B D B D D D B
6 6 7 7 6 6 6 5 6 5 5 5 4 5

Which, seek thro' the world, is ne'er met with else-where.
B B B D D B B B B DB D D B
6 6 7 7 6 6 6 5 6 55 5 4 4

Chorus

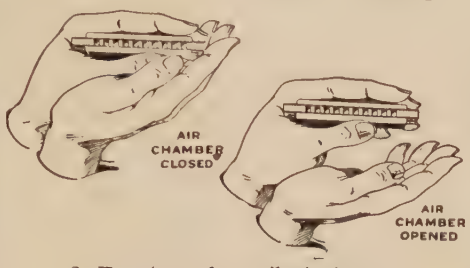
Home! Home! Home, sweet home! There's no place like home,
B D D B D B B BD D B B
6 5 4 4 4 5 6 7 7 6 6 6

There's no place like home.
B B DB D D B
5 6 5 5 5 4 4

The harmonica may be played with piano accompaniment. It is important, of course, that the harmonica and piano be played in the same key, and that they be accurate in pitch.

Merely playing the straight melody on the harmonica is not sufficient to make a good player. It should be played with a pleasing tonal effect known as *vibrato*. This effect may be obtained by holding the harmonica in the left hand, between the index finger and thumb, and closing the right hand over the left in such a way as to form a sort of air chamber, as shown in picture 2. When the right hand is rapidly moved in such a way as to open and close the air chamber, the *vibrato* is produced.

In obtaining a chord, or harmony, effect on the harmonica, the tongue may be made to serve the same purpose as the left hand, which provides the accompaniment for the pianist.



2. How to produce vibrato tones.

above the other. In the Chromonica tuned in the key of C, the two scales are C and C-sharp, as shown in picture 3. Through the use of a lever, shown in picture 4, only one scale is exposed to the breath at any one time. Therefore, when the lever is in its original position, the key of C is exposed to the breath, and upon shifting (pressing) the lever, the scale of C-sharp is automatically produced. Consequently, since a sharp to one note is a flat to the succeeding note, we have the successive half-tones which constitute the chromatic scale.

The Chromonica supplies all the missing half-tones not found in the ordinary harmonica. Almost any selection of music can be played perfectly on it. By a slight manipulation of a lever, sharps and flats of unfailing accuracy are secured.

When the lever is *not* in use, the Chromonica provides only the major scale and differs in no way from the regular Hohner harmonica. Only when a half-tone is desired is the lever used. The lever on the Chromonica is most conveniently operated with the index finger of the right hand. Pupils may find it of assistance to number the air holes of the Chromonica according to the arrangement provided in picture 4.

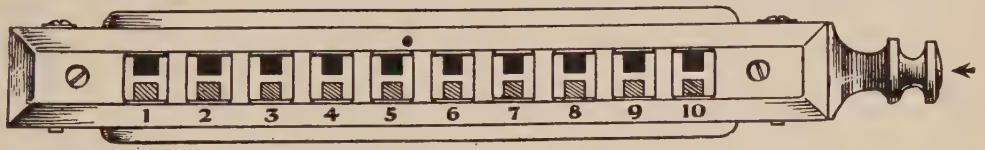
3. Notes made possible by use of the lever on the Chromonica.

An accompaniment to a melody may be easily obtained by moving the tongue on and off the harmonica in rhythm with the melody played. This "tonguing" provides a simple three-note accompaniment to the solo melody note. The solo note is continuously exposed to the breath. The three holes that are covered by the tongue constitute the notes of the chord and may be played as desired. The tongue should be moved on and off the accompaniment notes as many times as there are counts in a measure of a particular melody. For instance, in a march there are four counts to a measure, in a waltz there are three counts.

The Chromonica is the latest and most important invention in the history of the harmonica. On this instrument sharps and flats of unfailing accuracy may be obtained. The Chromonica really consists of two harmonicas tuned a half-tone apart and arranged one

The lowest note would be air hole No. 1, the last one to the right being air hole No. 10. Numerals may readily be engraved on the mouthpiece through the use of a penknife.

In the last year or two harmonica-playing has become so popular that in many cities harmonica bands have been formed. There are often, too, boys and girls who can play simple solos. The effect is extraordinary, and the harmonica-players soon give concerts at



4. The Chromonica.

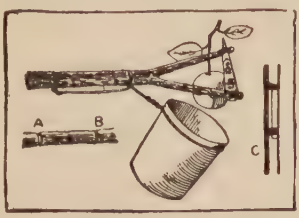
which all kinds of selections are offered. Some young people are wonderful soloists, especially on the Chromonica. Harmonica-playing contests have been held in many places, and thousands of boys and girls have competed for musical honors.

By following the directions we have given, school boys and girls ought to be able to form their own harmonica orchestras to furnish music for school concerts.

HINTS AND TRICKS FOR ODD MOMENTS

AN EASILY MADE APPLE-PICKER

IT is quite easy to make an ingenious apple-picker that will save us a lot of time and trouble when we are gathering the fruit in the orchard or garden. It spoils the apples to knock or shake them down, and it takes a long time to move our ladder about and climb all over the branches to reach every apple. But by means of the simple arrangement shown in the picture we can gather the apples carefully and well. We get a forked stick, and across the fork we tie an old knife-blade, after sharpening the edge. Then we cut two small grooves in the stick, eight inches apart, as seen in the picture, at *A* and *B*. A long piece of fairly stout wire is then twisted round a tin can, and the end is wound round the stick in the grooves. We must be careful to fix our can so that it will catch the apples as the knife cuts them, or all our trouble will be lost. The apple-picker is then ready. If we want it very long, we can make the stick or pole as long as we wish by splicing it in the manner shown at *C*, binding round the joint with wire.

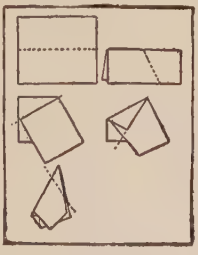


THE RABBITS' EARS

IF we were asked to draw three rabbits, and to give them only three ears between them, yet to make them appear as though they really had two ears each, no matter how clever we might be as artists, we should think that an impossible and ridiculous task had been set us. Yet such is not really the case, for, as can be seen by this picture, the drawing can actually be made and the conditions fulfilled. By a skillful arrangement of the three rabbits and the three ears, as shown in the picture, the little animals appear to be quite properly equipped with the right number of ears, although they have only three between them.

A STAR MADE WITH ONE CUT

IT would at first thought seem to be quite an impossibility to cut a five-pointed star out of a square of paper with one single snip of the scissors, and yet it is quite easy to do so. Everything, of course, depends upon the method of folding the paper before cutting, but if the square of paper be folded exactly as shown in the accompanying diagrams, and then the folded paper be cut with one snip in the direction of the dotted line in the fifth diagram, we shall have a star. In folding the paper at the stage shown in the fourth diagram, so as to get that shown in the fifth, we must fold from the point *A* across to the right. In all cases fold across the dotted line—that is, when you have the paper opened out flat, as in diagram 1, fold across the dotted line to make diagram 2; then, to get the shape shown in diagram 3, fold across the dotted line in diagram 2, and so on to position 5.

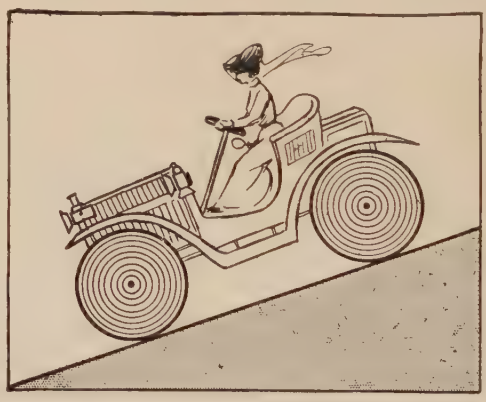


THE MAGIC WRITING

WE can have some fun with our friends by causing what seems to be magic writing to appear upon the surface of an ordinary looking-glass when it is breathed upon. Unknown to our friends, we write upon the glass with a piece of French chalk, and then we wipe out the writing with a soft cloth, such as a handkerchief. The writing cannot now be seen, but if we breathe upon the glass it will instantly become visible, and, to those not in the secret, will seem very mysterious and weird indeed. This is a good trick for Hallowe'en or Valentine parties. The writing can be done behind a curtain.

THE WHEELS THAT TURN

HERE is a picture of a motor car going along a hilly country road. There are no police traps, and the motor is going at a great speed. We can see that it is moving by the way the wheels are going round. We may not think at first that the motor is really going at all, but if we put this book down flat on the table and look steadily at the centre of either wheel, with our eyes about a foot from the book, and then, without raising the book from the table, give it a quick circular motion, the wheels will appear to be going round rapidly. On page 2746 you will find another example of how our eyes deceive us, in spite of the old saying "Seeing is believing."



THE NEXT THINGS TO MAKE AND TO DO ARE ON PAGE 7077.

WHAT THIS STORY TELLS US

A WORLD without fire would be a world of savages. How men first got fire we do not know. Perhaps it was from a volcano, or from a fire set by lightning. At first, after men had learned the value of fire, they did not dare let it go out, and when they moved from one place to another they carried burning coals with them. Next they learned to get fire by rubbing pieces of wood together, and then by sparks from flint and metal. Next came rude matches, which were expensive and dangerous, but which have been improved, until we can now carry them in the pocket with perfect safety and can get fire in a moment without trouble. The story and the pictures show you how matches are made by the million from logs and a few chemicals. If you will follow the story you can see why it is now possible to buy a thousand matches for a few cents. Made by hand, they would be very expensive.

HOW MATCHES ARE MADE

CONTINUED FROM 6824

IF you were ever on a picnic, or in camp, and suddenly found that the matches had been left behind, or had got wet and refused to strike, you quickly realized how much we depend upon these little pieces of wood with their crackling heads. They are so common and so cheap that we often forget what a convenience they are. Yet the world got along without matches for thousands of years; for the first real matches, something like those we have to-day, were made less than a hundred years ago.

When our ancestors first began to use fire to cook their food or to keep them warm, a central fire was kept burning all the time, so we are told. Certain persons were appointed to tend it and to see that it did not go out for want of fuel or because of the rain. From this central fire the different families would take a burning branch to kindle separate fires to cook their food. When the tribe moved, the fire was carried along too. It is not strange that many savages worshiped the dancing tongues of flame, which were so mysterious and terrible and yet so useful.

We know that some savages used to get fire, and still get it, by rubbing two pieces of dry wood together in different ways. This method is difficult, and not everyone can learn the knack of doing it. Men found an easier way after they learned the use of iron and steel. If a flint is struck sharply on a piece of steel, sparks fly off and will set some very dry substance on fire. The muskets used in the Revolutionary War were called flintlocks, because they used this idea. A little hole was bored through the barrel, and a few grains of powder were shaken out on the edge. A flint attached to the hammer, or lock of the gun, struck a piece of steel when the trigger was pulled, and the sparks set the powder outside on fire, and the flame exploded the powder inside the barrel.

During the pioneer days, and long afterward, many houses had tinderboxes, which contained some flints, a piece of steel, and some rags which had been baked until they were very dry. When a fire was wanted, sparks were struck into a bit of the tinder, as the half-burned rags were called. This would smolder, and, by blowing, tiny splinters could be lighted and soon there would be a roaring fire of logs in the great fireplace. Sometimes very dry rotten wood was used instead of tinder. You may have seen a piece of punk, which holds fire a long time.

Usually, however, the coals were covered with ashes at night so that they would keep alive. Sometimes this was forgotten, or perhaps the family went away from home for a few days, and the fire went out. If the house did not own a tinder-box, or if there was no tinder prepared, someone took an iron pot and went to a neighbor's house to get some live coals.

1680. In 1805 a man in Paris coated bits of wood with sulphur and tipped them with a little chlorate of potash mixed with sugar. When he wanted a light he dipped the tip into a bottle of sulphuric acid, and the combination caught on fire. Sulphuric acid, however, will eat through clothing, or burn the skin, and so this plan was found to be

The splints or matches having been forced into the tiny holes on the flexible iron band, pass through a bath of paraffin wax, and then over a roller covered with the composition which forms the striking heads.

How matches got rid of all this trouble

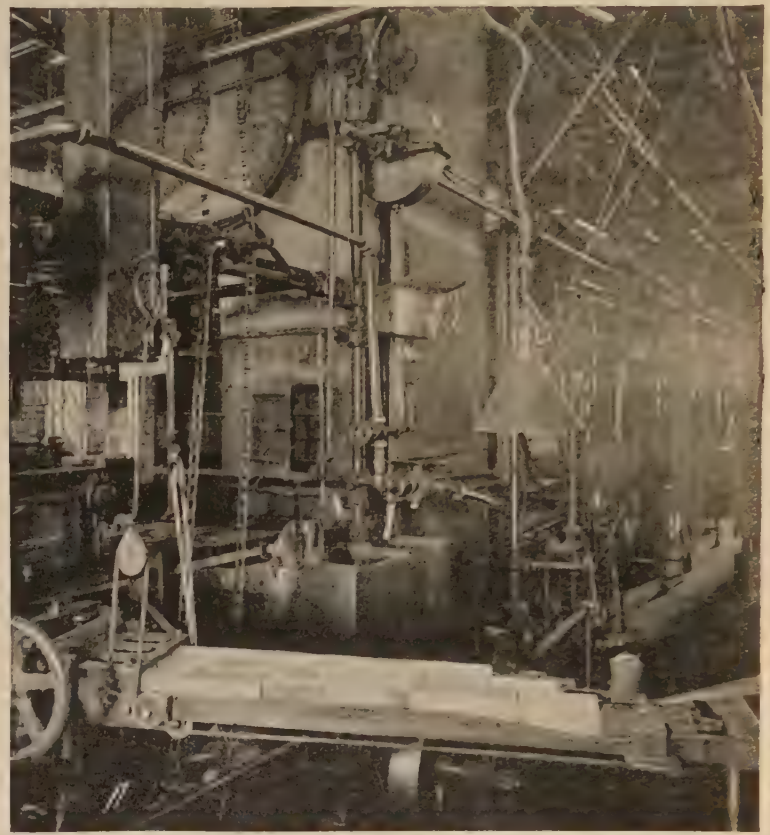
Now we get rid of all this trouble by using a match, and do not care very much if we must use two or three. This has not been true very long. The first matches made were very expensive and were considered a great luxury. Your grandfather or grandmother can tell you of the time when either there were no matches, or when they were too scarce to be used freely.

A man named Godfrey Haukwitz almost made a match as long ago as too clumsy and too dangerous for common use. The next matches were made in another way.

The first real matches were made by John Walker, an Englishman. They were tipped with antimony and potash, and with every box a sheet of folded sandpaper was furnished. The match was placed in the fold, which was tightly pressed together with one hand, and the match was jerked with the other. Sometimes the match caught on fire. You know that rubbing, or friction, produces heat. This is the secret of the match: to

THE BEGINNING OF A MATCH

Photo, courtesy E. B. Eddy Company, Ltd., Hull, Canada.



Photo, courtesy Diamond Match Company, New York.

White-pine planks, seasoned at least a year, are used in a match factory. The planks, which are about two inches thick, are planed on one side and then "butted" into blocks which measure the length of a match along the grain. The picture to the left shows this operation. To the right we see the blocks being fed into the match-making machine. The operator in charge chops out unsuitable portions not already removed in the butting.

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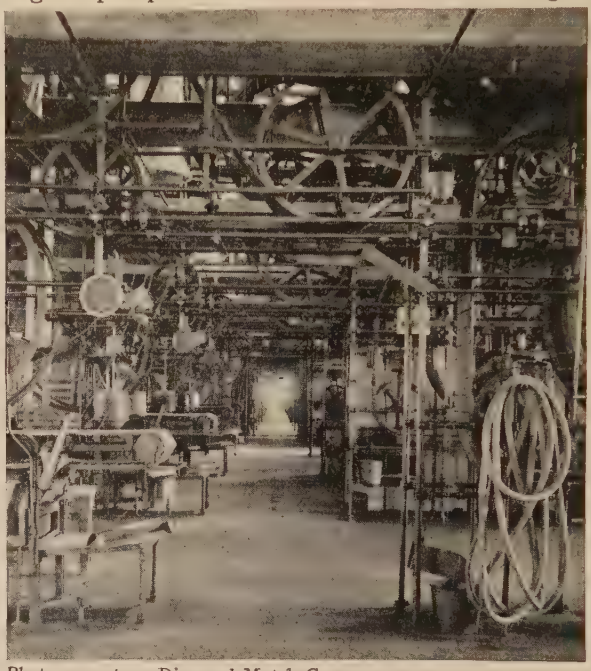
find some substance or substances which will flame from the heat produced by rubbing against a rough substance and yet will not be too dangerous to use. Some of these early matches are shown on pages 308 and 309.

Phosphorus, which flames at a low heat

Phosphorus had been discovered long before, but it catches on fire with very little heat, and was thought to be too dangerous to use for this purpose. It is poisonous besides. It was found, however, that by mixing the phosphorus with other substances a match could be made that would strike easily and yet was not likely to flame unless rubbed purposely. Several men found this out about the same time, for we find this same John Walker, and men in Germany and Austria making phosphorus matches in 1833. Matches were made in Springfield, Massachusetts, in 1836.



Photos, courtesy Diamond Match Company.
An interior view of a match factory.

The body, or stick, of a match is usually a small strip of wood, but sometimes it is a tiny wick of cotton stiffened with wax. Perhaps you have seen the beautiful little matches which the English call vestas. We often see strips of cardboard used in little books of matches which the tobacco shop gives away.

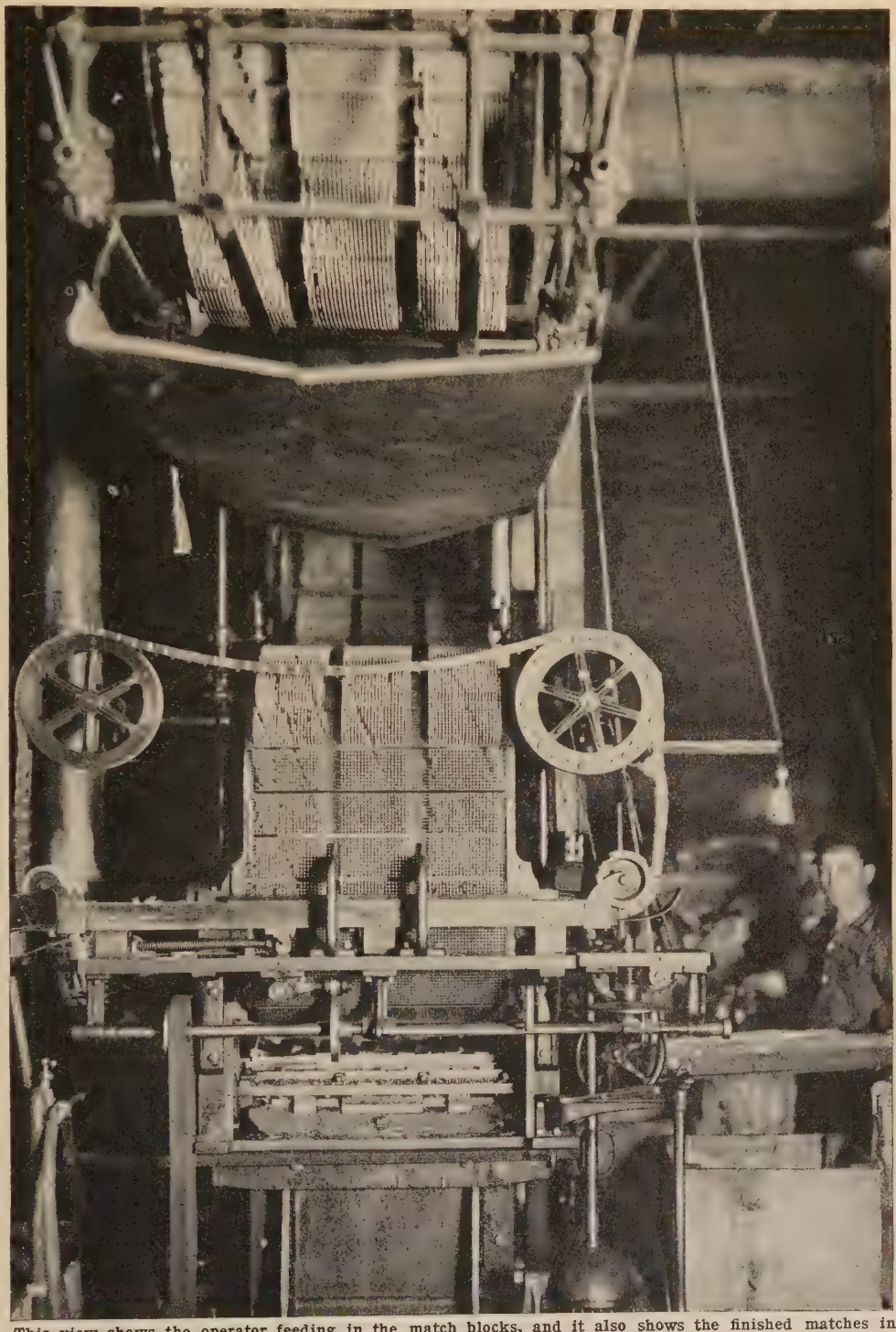
The substances in the head of a match are not always the same. Different manufacturers use different mixtures. There is always phosphorus in ordinary matches. Sulphur, nitre, lead, manganese and potash are used by different manufacturers. The double-dip, or "bird's-eye," match has a tiny striking tip, but most of the head is made of some substance which burns easily and gives a good flame. Matches made for use at the seaside, or where the wind blows strongly, have very large heads and burn quite slowly.

Matches are made in many sizes, kinds and brands, from the high-grade safe and reliable match of everyday life to the very special ones made for use in the Arctic, where life itself may depend upon the making of a fire. Once lighted, these Arctic matches cannot be extinguished even though submerged in water. The use of such matches in settled communities is forbidden by law. If they were in common use the danger from fires would be very much increased.

The ordinary matches used years ago did not catch on fire by themselves, but did cause many fires by rubbing together, or by being stepped upon, or by being nibbled by rats or mice. Sometimes a whole box in a man's pocket would catch on fire if he pressed against a wall or the arm of a chair. About 1852 safety matches were made by J. E. Lundstrom in Sweden. There is no phosphorus in the heads of these matches, but a certain kind of phosphorus is painted on the box. They light only when struck on the box or on a glassy surface, and therefore are much safer than ordinary matches. Now they are made in many parts of the world, and no other sort of matches should be carried in the pocket, unless one uses a metal matchbox.

Years ago workers in match factories were often attacked by a peculiar disease. The white phosphorus used attacked the teeth and the bones of the jaw, and caused great suffering. Now the use of white phosphorus is not allowed, but a harmless red phosphorus is used instead.

WHERE THE BLOCKS BECOME MATCHES



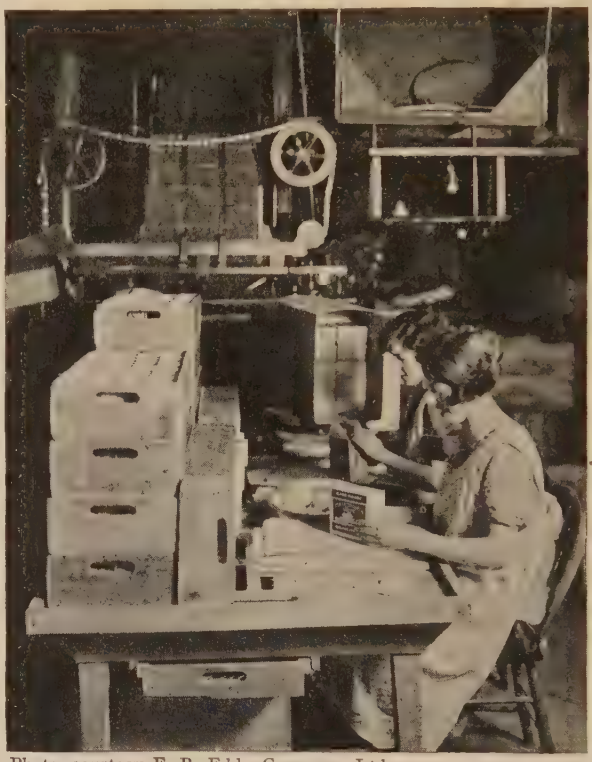
This view shows the operator feeding in the match blocks, and it also shows the finished matches in position on the machine and just before leaving it. It takes about one hour for the matches to make the trip around the machine.

Photo, courtesy E. B. Eddy Company, Ltd.

There are many steps in the making of matches. First the pine trees in the forest are felled. Those suitable for match manufacture are chosen and sawed into lumber. The lumber is inspected, and the suitable material is separated and piled for six months before it is inspected again. This is repeated at the end of each six months for a period of two years. The accepted planks are then sent to the factory and planed before being cut into blocks the length of a match. Another inspection takes place, and the blocks that are passed are sent to storage bins to cure. When cured, still another inspection is made before the blocks go to the match floor of the factory to be fed to the match machines.

After the blocks are fed into the match machine they are cut into splints or sticks, the regular match size. The splints are forced into small holes in steel plates. It is the forcing of the end into the plate that makes the small end which you can notice is opposite the head end. The plates with the splints sticking in them pass through a chemical solution the object of which is to prevent an afterglow when the match has been used and blown out. The carrying plates next travel through a drying chamber to drive off extra moisture and to fix the chemicals in the splint. The splints are then ready for a trip through hot paraffin wax, followed by another drying process by means of blasts of hot air. After this they pass to the composition mechanism of the machine and receive the proper amount of composition which puts the heads on them, thus changing them from pieces of wood into matches. After the heads have been put on, the plates follow a winding course while blasts of hot air are blown on the matches to dry and set the head material. The matches are finally automatically expelled from the plates on to circular tables, where they are packed into boxes. The empty plates pass on to receive a new head of splints.

The making of the composition with which the matches are tipped is an extremely intricate operation. Large mechanical grinders, similar to those used in the grinding of paint or chocolate, and many special appliances are used to mix thoroughly the hundred ingredients used. This requires very skilled workers.



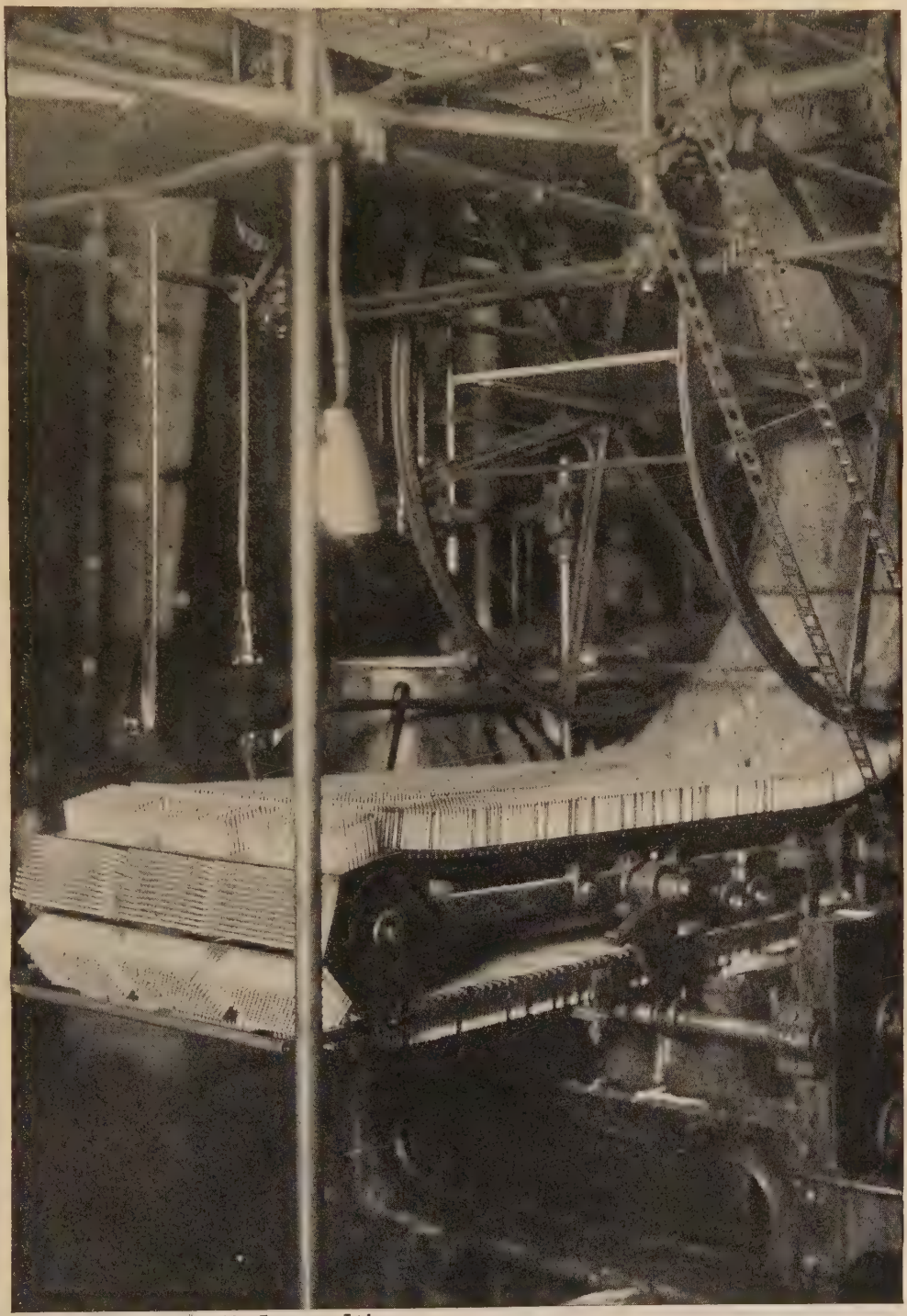
Photo, courtesy E. B. Eddy Company, Ltd.
Where boxes of matches are wrapped and packed for shipment.

In addition to the other precautions taken in all steps of their manufacture the matches are packed with extreme care. First, girls fill the individual boxes. In filling the boxes half of the match-heads are placed at one side of the box and half at the other side. The reason for this division is a precaution against fire. The cases, cartons and individual boxes are practically air-tight, so there is little oxygen available. If by accident the box catches on fire, the burning of the heads of one half of the matches in one box exhausts the supply of oxygen.

After the individual boxes are wrapped in paper cartons containing from five to twelve boxes, according to the size, the cartons are carefully packed in cases.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 7015.

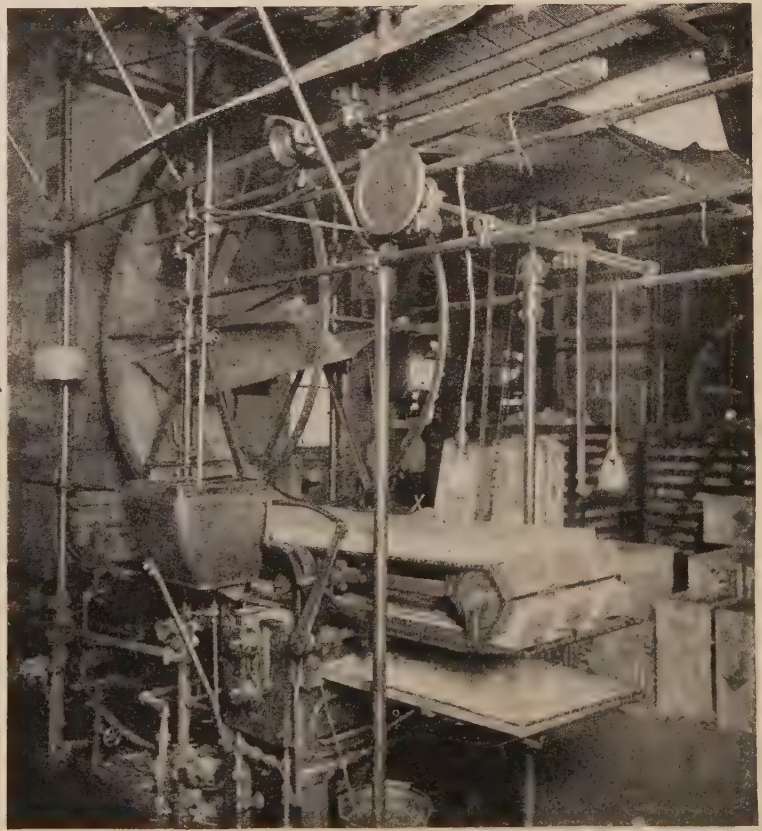
THE SPLINTS ARE BECOMING MATCHES

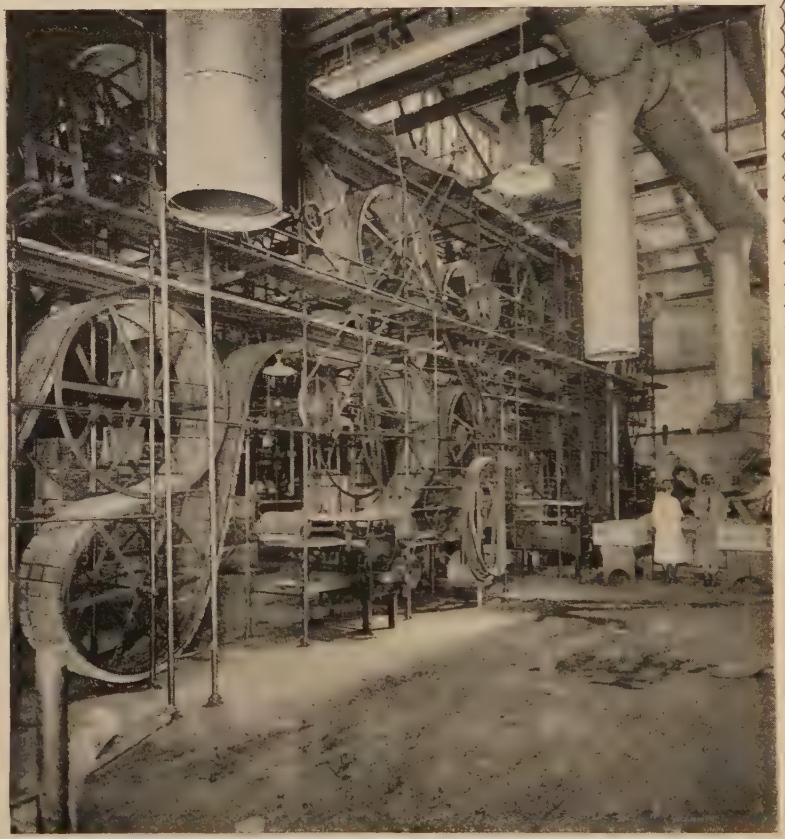


Photo, courtesy E. B. Eddy Company, Ltd.

When the match splints are in position on the machine they advance slowly past several "stations," where different operations are performed on them. These operations include: treating to prevent afterglow, dipping in paraffin wax, putting on the heads and discharging the finished match.

AFTER RECEIVING THE TIPS THE MATCHES ARE DRIED





To the left we see the matches on their endless chain about to be dipped in the "tipping" composition. To the right we have a splendid view of the endless chain of the match machine, which is so long that it can manufacture 600,000 matches an hour.

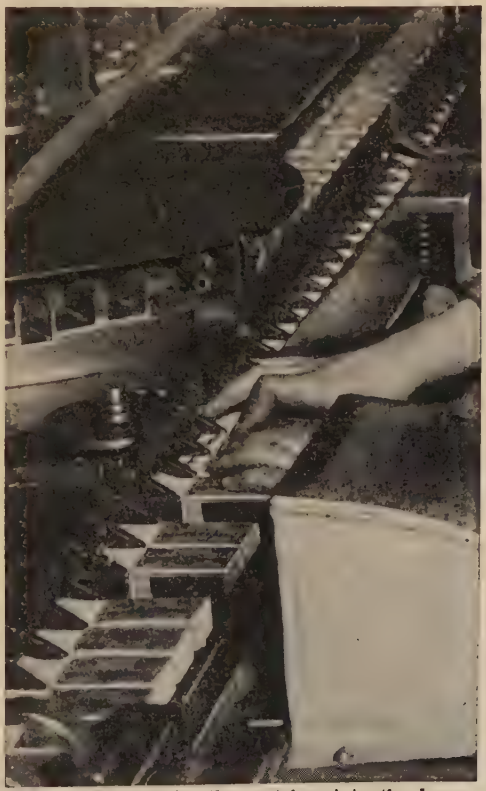
Photos, courtesy Diamond Match Company.

6972

PACKING THE MATCHES INTO THE BOXES

Veneer for match boxes is cut into short lengths called skillets, which are taken by this machine, folded, and stuck together by gummed paper.

The outer cases are made in a similar way, and here we see the continuous line of outers passing on to an endless conveyer to the drying-rooms.



This machine packs the matches into the boxes. Before the boxes are pressed into the cases they pass before watchers who pull out imperfect ones.

The boxes are then pushed home into the outer cases, and they pass down out of the machine, when they are ready for packing into dozens for the shops.

Upper right and lower right photographs from Underwood & Underwood.

THE CAPITALS OF PERU AND BOLIVIA

La Paz, the capital of Bolivia. The inset shows Mount Illimani in the background. The city, situated at an altitude of 12,100 feet, has a range of temperature from 44° to 73°, with an average of about 50°. About 95,000 people live here. Three railways radiate from it in different directions toward the Pacific.

The Cathedral in Lima, Peru. Its twin towers and broad façade look down upon the Plaza Mayor. First built in 1535, it was reduced by the great earthquake of 1746 to a mass of ruin; but it was reconstructed by 1758 practically as it now stands. In one of its richly decorated chapels lie the remains of Francisco Pizarro, the conqueror of Peru.

Photos, copyright, E. M. Newman; from Publishers Photo Service.

© Cody. "A Bucking Broncho."

THE REPUBLICS OF SOUTH AMERICA

PART I

CONTINUED FROM 6865

THREE small colonies in the north of South America were untouched by the wars of independence of which we read on page 6864. These colonies are French Guiana, Dutch Guiana and British Guiana. They belong, as their names indicate, to France, Holland and to the British Empire.

The three colonies changed hands several times. Dutch Guiana, or Surinam, was first settled by the English, but in the reign of Charles II was ceded to the Dutch, while by the same treaty New York was ceded to the English. On the other hand, British Guiana was first settled by the Dutch in the seventeenth and eighteenth centuries. The colonies were captured by the British more than once and were finally ceded to them at the close of the Napoleonic Wars. Since that time there have been boundary disputes with Venezuela, which lies to the west, and with Brazil; but the boundaries were settled by arbitration. A large proportion of the population is composed of East Indians and negroes. Of the white inhabitants much the larger number are Portuguese. There have been no striking events in the history of Dutch Guiana since it became a possession of Holland. The population is small, and more than half its number is composed of native Indians. East Indians are employed on the rice and sugar plantations. Settlements were made in French Guiana, or Cayenne, in the year 1626, and, with the exception of a few years during the Napoleonic Wars, this colony has ever since remained in possession of the French.

To free themselves from Spanish rule, Venezuela and New Granada united to form the Republic of Colombia, which included Ecuador. Simon Bolivar, "the Liberator," was chosen as first president, and the city named for him was made the capital. In 1829 the union was broken at the desire of Venezuela, and that country set out in her career alone. The first president, José Antonio Páez, was a strong man, who had made a name as a leader during the revolution. Whether he was in or out of office, Páez held the power, and generally kept the peace, for about twenty years. Since that time the government has been very unsettled. Too often the president has come into power on top of a revolt, and the longest period of peace has been

between the years 1880 and 1892, when, like Páez, Guzman Blanco held the power whether he was president or not. In 1910, however, Juan Vicente Gomez was elected president. He was re-elected in 1915, and again in 1922, and is still (in 1925) in power and seeking to give his country the blessings of a settled rule.

As we have seen, the Spanish conquerors went to the country, not to settle, but in search of gold. The first colonists did not take their families with them, and those who settled in the country freely intermarried with the natives. This was done even by officials in the provinces. The Spanish and Portuguese have never held the scorn for people of mixed race that northern people have, and consequently intermarriages continued even after settlers commenced to bring their families to the country. This was the case especially in the hot regions of the north, where European women and children found it hard to live. As a result, the greater part of the population is composed of a restless, childish race, descended from Spaniards and Indians, or Spaniards and negroes. Many of the Venezuelans are, of course, of pure Spanish descent, but they are few in proportion to the numbers of the population.

Although by law education is compulsory, there are not nearly enough schools to enable the children to be taught. A large proportion of the population cannot even read or write, and you can see how easily a clever man can stir these ignorant, excitable people to revolt against the government and place him in power.

Venezuela has had disputes about boundaries with Colombia and Great Britain. The matter was, however, referred to arbitration; wise men decided the matter and there was no war. The dispute with Colombia was also arbitrated, but the boundary decided upon by the king of Spain, who was the arbitrator, has never been surveyed.

There are about six hundred miles of railway in the country. Recently the roads have been much improved, and are reaching out along the coast and south toward the Orinoco. In remoter parts, away from the rivers, traffic is also carried on by means of pack-animals or small mule carts. About half the country is covered by forest. Another large section consists of the llanos, or great plains in the central part of the country, which are watered chiefly by the Orinoco and its tributaries. The climate, of course, is very hot except in the high mountain valleys, where nearly all the crops of the temperate regions can be grown.

Immense tracts of Venezuela have never been explored. In some places tribes of independent Indians live under their own chiefs. Large numbers of these Indians know nothing of Christianity, and live almost as they did when they were first discovered by Europeans. Many of them, however, are very intelligent, and if treated with wisdom they could be taught the ways of our civilization without losing what is best of their own.

THE PROVINCES THAT WERE LOST TO COLOMBIA

A great deal of what we have said about Venezuela might just as well be the story of Colombia. There is one great difference, however: revolutions have not often succeeded, and the presidents of the republic, with two exceptions, have been elected. When Spanish rule was first overthrown Ecuador and Panama, as well as Venezuela, were joined to Colombia. Ecuador declared its independence about the same time as Venezuela, but Panama continued to be part of Colombia until 1903, when it broke away. There might have been a war between the two states then, but the sympathies of the United States were with Panama, and its influence was strong enough to keep peace. The story of the revolution, however, belongs to the story of Central America, which you will find on page 7131.

The mountains in both Colombia and Venezuela are rich in minerals. Although it has not been much worked, iron is found in both these states, and there are valuable deposits of oil in Venezuela. Ecuador is famous for its emerald mines, and gold is still found in both countries.

The llanos stretch from Venezuela into Colombia, almost to the foot of the Andes. Colombia is much more mountainous than Venezuela, and up in the mountain plateaus and valleys there are large tracts of rich land. Bogotá, the capital, is in the ancient Chibcha country, where, in spite of the fact that it is only a few degrees north of the Equator, the climate is not extremely hot.

ECUADOR'S STORMY HISTORY OF REVOLUTIONS

Since the War of Independence, Ecuador has had the same history of revolu-

ODD SCENES IN COLOMBIA AND ECUADOR

A fountain near Bogotá, federal capital of Colombia.

A railway in the streets of Guayaquil, in Ecuador.

© E. M. Newman, from Publishers Photo Service.

A Guaki school on the borders of Lake Titicaca, Bolivia. Notice the large abacus in front of the pupils.

This curious market is at Guayaquil, in Ecuador. Instead of using stalls, the sellers arrange their goods in canoes, to which the purchasers go marketing.

There are extensive cocoa plantations at La Clementina, in Ecuador. The houses of the laborers are curiously built on long poles like stilts, as shown here.

tion as every other South American republic. The people do not really understand the meaning of popular government. The president, as a rule, is a dictator, and holds power until another leader becomes strong enough to have himself elected by force.

A large part of the country is mountainous, and the most thickly populated regions are the plateaus of which the Incas had obtained possession. Quito, the capital, where, you remember, Atahualpa held his court, is only a few miles away from the Equator, but it is built so high up in the mountains that it has a temperate climate. A railway and a telegraph line run from the port of Guayaquil to Quito, and there are short lines of railway running inland from the ports of Bahia and Manta. The country, as you may see from the map, lies along the Equator, and the climate of the lower valleys is very hot.

Navigable rivers run through the coastal plain, and in this low country they take the place of roads. For the most part the roads through the mountains are only trails, and travel from one part of the country to another is very difficult. Indeed a great deal of Ecuador has never been explored.

Uncivilized Indians inhabit the forests of the coast and the east. Indians form by far the largest part of the population. It is estimated that there are about 400,000 *mestizos,* or people of Spanish and Indian descent, and about 100,000 white people, chiefly, of course, of Spanish descent, all of whom look down upon the Indians and treat them as an inferior race. Yet the Indians are intelligent. You remember that the Indians of the mountain regions had their own civilization before the Spanish conquest, and if they were wisely treated many of them could be educated.

Education is compulsory, but although there are three universities, there are only about 1,300 primary schools in the whole country. As in all the other republics, many of the people who can afford to do so send their children to Europe or to the United States to be educated.

Bolivia a mountainous inland state

At the conclusion of the War of Independence, Upper Peru, which had been part of the Spanish province of La Plata, elected to separate from Argentina, and took the name Bolivia in honor of the Liberator. The people were no better prepared for independence than the people of the other republics, and scarcely had a president been chosen when bloody revolution followed revolution, with bewildering changes of government. Not content with fighting in their own country, the Bolivians interfered, in 1835, in a revolution in Peru. Chile then attacked Bolivia, and there were some years of warfare between the three states.

The limits of the Spanish provinces had never been defined properly. The boundaries, therefore, which the republics inherited were very vague, and the want of a definite statement of the territory of each country has led to many disputes. Bolivia and Chile had such a dispute about forty years after they won independence. The question was settled then by a treaty by which the boundary line was defined and Chileans were given the right to mine nitrates in the desert of Atacama. Later on a dispute arose over a question of duty to be paid on the nitrates, and Chile seized one of the Bolivian ports. Bolivia declared war, and Peru, which had a treaty with Bolivia, was drawn in. The Chileans were victorious on land and sea. Peru, weakened by revolutions at home, made peace, and thus left alone, Bolivia, which was also weakened by revolution, had no alternative but to sign a treaty of peace dictated by Chile. By this war Bolivia lost all her coast-line and is now an inland state. Some years later she had a boundary dispute with Brazil which was settled by Brazil's paying a large sum in exchange for part of the territory in dispute.

Since the beginning of the twentieth century the elections of presidents have been peaceful. The country is quieting down to a settled rule, and is becoming much more prosperous. Its wealth lies principally in minerals. Much silver and tin are exported, but lately the gold-mines have been little worked. The eastern provinces are rich, and the forests produce large quantities of rubber. The crude rubber is made into balls which Indians make into rafts and thus float it down the river Madeira to the Amazon, and thence to the sea. You may read about this on page 1405.

Railways now run from Arica and Antofagasta, on the Chilean coast, to La Paz, the principal city of Bolivia. The

SOME CITIES OF SOUTH AMERICA

THE CITY OF ROSARIO, IN ARGENTINA, SEEN FROM THE RIVER PARANA

BARRANQUILLA, THE CHIEF PORT OF COLOMBIA, ON THE MAGDALENA RIVER

CARACAS, THE CAPITAL OF VENEZUELA, IS 3,000 FEET ABOVE THE SEA

THE CITY OF MANAOS, ON THE AMAZON, IN BRAZIL

roadways throughout the country are poor. Away from the railways horses and mules are used to carry travelers through the mountains, and natives, mules and llamas carry freight from place to place. Traffic on Lake Titicaca and on the Bolivian rivers is carried on by steamers.

More than half the population is composed of native Indians, and more than a quarter of *mestizos*, the mixed race. The other quarter is made up principally of white people. Education is free and compulsory by law; but, as usual in South America, the schools are few and poor. The great mass of the Indians and large numbers of the *mestizos* cannot read or write.

The mountain Indians are descended from the tribes which were ruled by the Incas; but centuries of oppression have made them stupidly obstinate, and the great majority of them are very poor. Many of them still live in village communities such as existed in Inca times, which shows that this is the type of government which is best suited to them.

Military service is compulsory, and advantage is now taken of their presence in the army to teach some of the Indians to read and write. Efforts are also being made to establish schools to teach young Indians better ways of agriculture, for these people still use the implements that were in use in Inca times.

PERU A LAND OF MYSTERIOUS RUINS

Peru is a land of great ruins. When the Spaniards conquered Cuzco and the plateau of Titicaca they found there ruins of forts, cities and temples built of enormous stones. The Incas had a faint tradition that long, long ago their ancestors, the children of the sun, had built these temples and cities. That is all we know about them. The stones used in their construction are immense. The engineering skill and the mason work of the builders were wonderful. No mortar was used to hold the stones together, and yet the walls have stood for untold centuries, and it is impossible to-day to insert the thinnest knife-blade between their joints.

The greatest mystery of all is that at the time these buildings were erected the plateau of Titicaca must have been thickly populated, yet in its present state it will support only a very sparse population. Oca, which is a root something like a potato, grows there, and so does a small grain; but corn will not ripen, nor will any of the cereals introduced by Europeans. How then did a large population live? No one knows; but some students suppose that the mountains may have risen to their present height after the Megalithic, or Great Stone, people had finished their work. Lake Titicaca is 13,861 feet above the sea and is the highest lake in the world. The boundary line between Peru and Bolivia runs through this lake.

Peru was the last of the Spanish provinces to obtain independence. Whether the majority of the people wished it or not, they had no opportunity to throw off the yoke, for the country was the centre of Spanish power, and freedom had to be brought to them from without. It was plain, of course, that as long as the Spaniards had a foothold in the country they would make efforts to regain the territory they had lost. Therefore San Martin, the Argentine leader, and the navy of Chile, under Lord Cochrane, an English officer, invaded Peru. The army of Colombia, under Simon Bolivar, also gave help. Then the Spanish viceroy was driven out, and Peru became independent.

Independence did not bring peace. A war with Colombia was followed by the usual period of revolutions, and one revolutionary general after another made himself president, or rather military dictator. One of these was a descendant of the Incas named Santa Cruz, who sought to make the country prosperous, and endeavored to unite Bolivia and Peru into something like the old Inca empire.

On the whole, however, the government of Peru has been much more peaceful than that of the other countries of which we have told you. From 1845 to 1879 was practically a period of peace. In the early part of this period the country prospered, but later too much money was spent on public works, and the government became almost bankrupt, in spite of large sums of money made from the deposits of guano and nitrate in the coastal desert and on the islands. These valuable deposits led to a disastrous war with Chile. The fleet which Peru had been building up was destroyed, the Peruvian armies were defeated, and Lima, the capital, with Callao, its port, were occupied

THE REPUBLIC OF URUGUAY

Parque Hotel, Montevideo.

Legislative Palace, Montevideo.

Pocitos Beach near Montevideo, capital of Uruguay.

Montevideo, on the estuary of La Plata River.

New Carrasco Hotel, Montevideo.

Montevideo Cathedral.

The Central Railway Station, Montevideo.

The town of Paysandu in Uruguay.

Photo of New Carrasco Hotel from Publishers Photo Service; others by Burton Holmes, Ewing Galloway, the E. N. A., and others.

by the Chileans. When peace was made in 1883 Chile was able to keep possession of the nitrate coast of Peru, as well as the coast provinces which she had taken from Bolivia.

Since the country settled down after the war, there have been peaceful periods, broken now and then by revolutions. Some of the presidents have been quietly elected, others have succeeded by means of civil war. Nevertheless, the country has prospered, and progress has been made in industry and commerce.

The coast of Peru lies in the dry belt. Much of it is desert, but the high plain is broken by many fertile valleys, in which corn and sugar-cane are grown. Most of the people of the country, however, live in the high, cool valleys between the mountain ranges, where the ancient inhabitants built aqueducts and made terraced fields and gardens on the steep mountainsides. On the eastern sides of the mountains Peru owns rich forest land, and part of the great central plain.

More than half the people of Peru are Indians, and more than a fourth a mixed race, so you see that less than a fourth are of pure European descent. There are a few negroes, but not many. Many of the Indians tend their flocks of llamas high up on the mountainsides.

There are a number of railways in the country. You can go by train from the coast to Lake Titicaca, and sail down the lake in a steamboat, while from its decks you watch the Indians sail along the shores in their reed boats called *balsas*. Another branch of the same railway will bring you to the great copper-mines or to Cuzco, the ancient Inca capital. There are other railways, but none across the mountains, and the eastern commerce reaches the Atlantic down the great Amazon waterway. All the rubber from the lowland forests comes to us in this way. Ocean-going steamboats sail up the Amazon to Iquito, and smaller boats go a long way up the rivers into the mountain valleys.

URUGUAY HAS BECOME A PROSPEROUS COUNTRY

The story of Uruguay is bound closely to the story of Brazil and Argentina, as each of these great republics sought to make the little state part of its territory.

At one time Brazil succeeded in conquering Uruguay; but in a few years the Uruguayans regained their independence. Then followed a period of civil war between parties called the "reds" and the "whites," and for nearly half a century the country was kept in a state of distraction by the rival parties. In the last years of the nineteenth century, however, a period of orderly government began, and in spite of one or two efforts at revolution the country is becoming a prosperous modern state. Like all the other states of which we have been telling you, education in Uruguay is compulsory, but there are not enough schools.

The *gauchos*, who compose a large part of the population, are of mixed Spanish and Indian descent. The Indian tribes were practically exterminated in a war in which they sought to drive out the Spanish invaders. There has been a good deal of immigration into the state, chiefly from Italy, Brazil and Argentina.

PARAGUAY, THE INDIAN REPUBLIC

The story of Paraguay is a tragic one. The population is almost entirely composed of Indians of the Guarani tribes, who, when the Spanish entered the country, had already learned the simple forms of cultivation. They were a peaceable people and easily conquered by the Spanish, and as we told you on page 6862, many thousands lived at one time in Jesuit missions. After the country became independent these simple Indians were easily dominated by the white inhabitants, and for about fifty years the land was ruled by dictators. The first of these, José Francia, who ruled for nearly thirty years, literally turned the country into a "hermit land." None of the inhabitants were permitted to leave. No foreigners were allowed to enter. It is said that this policy was in a sense a good one, since it forced the people to rely upon themselves and to learn to supply their own needs.

He was succeeded by Carlos Antonio Lopez, who changed Francia's plans, tried to establish commerce, and began to build railways. Under his rule the country began to gain in prosperity. He was succeeded in power by his son, whose mind was filled with wild ambitions. In an endeavor to carry them out he began a war with Brazil, Argentina and Uruguay, which ended only with his death in 1870.

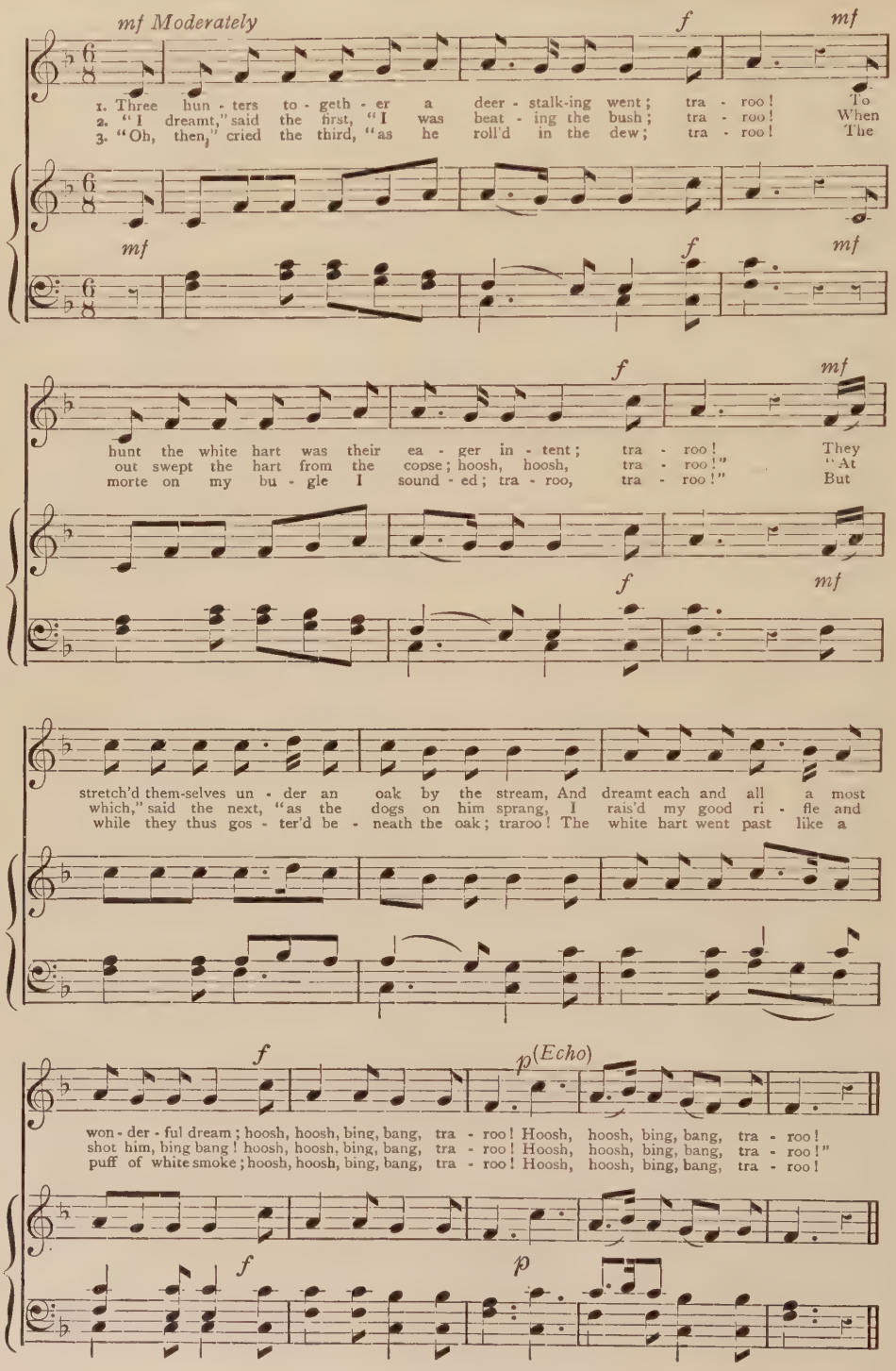
THE NEXT STORY OF ALL COUNTRIES IS ON PAGE 7033.

A great copper smelter at Casapalca, Peru. Copper is found in great abundance and has superseded silver as the most valuable mineral product of the country. The principal centre of both silver- and copper-mining is the Cerro de Pasco district. Both American and British companies are interested.

Passa Tagli Torc, an old Spanish palace in Lima, now used as an office building for the war department. Military service is compulsory and universal in Peru, though only a limited number of conscripts are called for active duty with the colors. Photos, copyright, E. M. Newman, from Publishers Photo Service.

THE WHITE HART

Words by ALFRED P. GRAVES. Music by permission of MESSRS. SCHOTT & Co.


mf Moderately
1. Three hun - ters to - geth - er a deer - stalk-ing went; tra - roo! To
2. "I dreamt," said the first, "I was beat - ing the bush; tra - roo! When
3. "Oh, then," cried the third, "as he roll'd in the dew; tra - roo! The
hunt the white hart was their ea - ger in - tent; tra - roo! They
out swept the hart from the copse; hoosh, hoosh, tra - roo!" "At
morte on my bu - gle I sound - ed; tra - roo, tra - roo!" But
stretch'd them-selves un - der an oak by the stream, And dreamt each and all a most
which," said the next, "as the dogs on him sprang, I rais'd my good ri - fle and
while they thus gos - ter'd be - neath the oak; traroo! The white hart went past like a
won - der - ful dream; hoosh, hoosh, bing, bang, tra - roo! Hoosh, hoosh, bing, bang, tra - roo!
shot him, bing bang! hoosh, hoosh, bing, bang, tra - roo! Hoosh, hoosh, bing, bang, tra - roo!"
puff of white smoke; hoosh, hoosh, bing, bang, tra - roo! Hoosh, hoosh, bing, bang, tra - roo!
f
mf
p (Echo)

A SELECTION FROM HIAWATHA

THE scene of this poem is laid among the Ojibways, an Indian tribe on the southern shore of Lake Superior, in the region between the Pictured Rocks and the Grand Sable. The song is founded on a tradition that Hiawatha, a great warrior and teacher of mysterious origin, was sent to instruct the Indians in the arts of peace. He invented the birchbark canoe, and taught the people how to clear their watercourses and fishing-grounds. When rumors of war arose he went with his daughter to attend a council of braves. As he stepped from his canoe a huge white bird dropped upon his daughter and crushed her to earth, and when the bird's body was lifted no trace of the girl could be found. Hiawatha silently bore his grief, but later called together the Five Tribes and gave them a plan of union. Then he bade them all a solemn farewell. Around this legend Longfellow has woven many tribal myths. Hiawatha, the Wise Man, was the son of Mudjekeewis, the West Wind, and Wenonah, the daughter of Nokomis.

THE SONG OF HIAWATHA

HIAWATHA'S CHILDHOOD

CONTINUED FROM 6874

BY the shores of Gitche Gumee,
By the shining Big-Sea-Water,
Stood the wigwam of Nokomis,
Daughter of the Moon, Nokomis.
Dark behind it rose the forest,
Rose the black and gloomy pine-trees,
Rose the firs with cones upon them;
Bright before it beat the water,
Beat the clear and sunny water,
Beat the shining Big-Sea-Water.
There the wrinkled old Nokomis
Nursed the little Hiawatha,
Rocked him in his linden cradle,
Bedded soft in moss and rushes,
Safely bound with reindeer sinews;
Stilled his fretful wail by saying,
"Hush! the Naked Bear will get thee!"
Lulled him into slumber, singing,
"Ewa-yea! my little owlet!
Who is this, that lights the wigwam?
With his great eyes lights the wigwam?
Ewa-yea! my little owlet!"

. . . . . .

At the door on summer evenings
Sat the little Hiawatha;
Heard the whispering of the pine-trees,
Heard the lapping of the waters,
Sounds of music, words of wonder;
"Minne-wawa!" said the pine-trees,
"Mudway-aushka!" said the water.
Saw the fire-fly, Wah-wah-taysee,
Flitting through the dusk of evening,
With the twinkle of its candle
Lighting up the brakes and bushes,
And he sang the song of children,
Sang the song Nokomis taught him:
"Wah-wah-taysee, little fire-fly,
Little, flitting, white-fire insect,
Little, dancing, white-fire creature,
Light me with your little candle,
Ere upon my bed I lay me,
Ere in sleep I close my eyelids!"
Saw the moon rise from the water
Rippling, rounding from the water,
Saw the flecks and shadows on it,
Whispered, "What is that, Nokomis?"
And the good Nokomis answered:
"Once a warrior, very angry,
Seized his grandmother, and threw her
Up into the sky at midnight;
Right against the moon he threw her;
'Tis her body that you see there."
Saw the rainbow in the heaven,
In the eastern sky, the rainbow,
Whispered, "What is that, Nokomis?"
And the good Nokomis answered:
"'Tis the heaven of flowers you see there;
All the wild-flowers of the forest,
All the lilies of the prairie,
When on earth they fade and perish,
Blossom in that heaven above us."
When he heard the owls at midnight,
Hooting, laughing in the forest,
"What is that?" he cried in terror,
"What is that," he said, "Nokomis?"
And the good Nokomis answered:
"That is but the owl and owlet,
Talking in their native language,
Talking, scolding at each other."

. . . . . .

Then Iagoo, the great boaster,
He the marvelous story-teller,
He the traveler and the talker,
He the friend of old Nokomis,
Made a bow for Hiawatha;
From a branch of ash he made it,
From an oak-bough made the arrows.

Tipped with flint, and winged with feathers,
And the cord he made of deer-skin.
Then he said to Hiawatha:
"Go, my son, into the forest,
Where the red deer herd together,
Kill for us a famous roebuck,
Kill for us a deer with antlers!"
Forth into the forest straightway
All alone walked Hiawatha
Proudly, with his bow and arrows;
And the birds sang round him, o'er him,
"Do not shoot us, Hiawatha!"
Sang the robin, the Opechee,
Sang the blue-bird, the Owaissa,
"Do not shoot us, Hiawatha!"
Up the oak-tree, close beside him,
Sprang the squirrel, Adjidaumo,
In and out among the branches,
Coughed and chattered from the oak-tree,
Laughed, and said between his laughing,
"Do not shoot me, Hiawatha!"
And the rabbit from his pathway
Leaped aside, and at a distance
Sat erect upon his haunches,
Half in fear and half in frolic,
Saying to the little hunter,
"Do not shoot me, Hiawatha!"
But he heeded not, nor heard them,
For his thoughts were with the red deer;
On their tracks his eyes were fastened,
Leading downward to the river,
To the ford across the river,
And as one in slumber walked he.
Hidden in the alder-bushes,
There he waited till the deer came,
Till he saw two antlers lifted,
Saw two eyes look from the thicket,
Saw two nostrils point to windward,
And a deer came down the pathway,
Flecked with leafy light and shadow.
And his heart within him fluttered,
Trembled like the leaves above him,
Like the birch-leaf palpitated,
As the deer came down the pathway.
Then, upon one knee uprising,
Hiawatha aimed an arrow;
Scarce a twig moved with his motion,
Scarce a leaf was stirred or rustled,
But the wary roebuck started,
Stamped with all his hoofs together,
Listened with one foot uplifted,
Leaped as if to meet the arrow;
Ah! the singing, fatal arrow,
Like a wasp it buzzed and stung him!
Dead he lay there in the forest,
By the ford across the river;
Beat his timid heart no longer,
But the heart of Hiawatha
Throbbed and shouted and exulted
As he bore the red deer homeward,
And Iagoo and Nokomis
Hailed his coming with applauses.
From the red deer's hide Nokomis
Made a cloak for Hiawatha,
From the red deer's flesh Nokomis
Made a banquet to his honor.
All the village came and feasted,
All the guests praised Hiawatha,
Called him Strong-Heart, Soan-ge-taha!
Called him Loon-Heart, Mahn-go-taysee!

HIAWATHA'S DEPARTURE

Slowly o'er the simmering landscape
Fell the evening's dusk and coolness,
And the long and level sunbeams
Shot their spears into the forest,
Breaking through its shields of shadow,
Rushed into each secret ambush,
Searched each thicket, dingle, hollow;
Still the guests of Hiawatha
Slumbered in the silent wigwam.
From his place rose Hiawatha,
Bade farewell to old Nokomis,
Spake in whispers, spake in this wise,
Did not wake the guests, that slumbered:
"I am going, O Nokomis,
On a long and distant journey,
To the portals of the Sunset,
To the regions of the home-wind,
Of the Northwest-Wind, Keewaydin.
But these guests I leave behind me,
In your watch and ward I leave them;
See that never harm comes near them,
See that never fear molests them,
Never danger nor suspicion,
Never want of food or shelter,
In the lodge of Hiawatha!"
Forth into the village went he,
Bade farewell to all the warriors,
Bade farewell to all the young men,
Spake persuading, spake in this wise:
"I am going, O my people,
On a long and distant journey;
Many moons and many winters
Will have come, and will have vanished,
Ere I come again to see you.
But my guests I leave behind me;
Listen to their words of wisdom,
Listen to the truth they tell you,
For the Master of Life has sent them
From the land of light and morning!"
On the shore stood Hiawatha,
Turned and waved his hand at parting;
On the clear and luminous water
Launched his birch canoe for sailing,
From the pebbles of the margin
Shoved it forth into the water;
Whispered to it, "Westward! Westward!"
And with speed it darted forward.
And the evening sun descending
Set the clouds on fire with redness,
Burned the broad sky, like a prairie,
Left upon the level water
One long track and trail of splendor,
Down whose stream, as down a river,
Westward, westward Hiawatha
Sailed into the fiery sunset,
Sailed into the purple vapors,
Sailed into the dusk of evening.
And the people from the margin
Watched him floating, rising, sinking,
Till the birch canoe seemed lifted
High into that sea of splendor,
Till it sank into the vapors
Like the new moon slowly, slowly
Sinking in the purple distance.

THE WILD ROSE

The following is one of the most widely known of Goethe's lyrics. The encounter between the selfish boy and the delicate rose, which has only its thorns to protect it, is delightfully portrayed. Franz Schubert composed the music for this pretty lyric.

A BOY espied, in morning light,
A little rosebud blowing;
'Twas so delicate and bright
That he came to feast his sight,
And wonder at its growing.
Rosebud, rosebud, rosebud red,
Rosebud brightly blooming.

"I will gather thee," he cried,
"Rosebud brightly glowing!"
"Then I'll sting thee," it replied,
"And you'll quickly start aside
With the prickle glowing."
Rosebud, rosebud, rosebud red,
Rosebud brightly blowing.

But he plucked it from the plain,
The rosebud brightly blowing!
It turned and stung him, but in vain—
He regarded not the pain,
Homeward with it going.
Rosebud, rosebud, rosebud red,
Rosebud brightly blowing.

THE MOSS ROSE

This little poem is by Krummacher, who is classed with William Cullen Bryant as a nature poet. He is especially noted for his poems about the Alps.

THE Angel of the flowers, one day,
Beneath a rose tree sleeping lay,—
That spirit to whose charge 'tis given
To bathe young buds in dews of heaven.
Awakening from his light repose,
The Angel whispered to the rose:
"O fondest object of my care,
Still fairest found, where all are fair,
For the sweet shade thou giv'st to me
Ask what thou wilt, 'tis granted thee."
"Then," said the rose with deepened glow,
"On me another grace bestow."
The spirit paused in silent thought,—
What grace was there that flower had not?
'Twas but a moment, o'er the rose
A veil of moss the Angel throws,
And, robed in nature's simplest weed,
Could there a flower that rose excel!

THE PRETTY FISHER MAIDEN

Heinrich Heine wrote this song, for which Franz Schubert wrote the music. It is one of the best known German lyrics which have made him popular.

COME, fairest fisher maiden, here,
Put, put thy skiff to land;
Come close to me and sit thee down,
And prattle hand in hand.

Oh, lay thy head upon my heart,
Have not such fear of me,
Thou trustest day by day thyself
Unto the wild, wild sea.

My heart is like the sea, it hath
Its storm, and ebb and flow;
And many pretty pearls, my love,
Rest in its depth below.

WHITHER?

Wilhelm Müller, like Heine, implies that all water is inhabited by some fairy or water-nymph. It is a fanciful idea to suggest that instead of the noise caused by the water flowing over the rocks and pebbles, the nymphs are singing their alluring songs.

I HEARD a brooklet gushing
From its rocky fountain near,
Down into the valley rushing,
So fresh and wondrous clear.

I know not what came o'er me,
Nor who the counsel gave;
But I must hasten downward,
All with my pilgrim stave;

Downward and ever farther
And ever the brook beside,
And ever fresher murmured
And ever clearer the tide.

Is this the way I was going?
Whither, O brooklet, say!
Thou hast, with thy soft murmur,
Murmured my senses away.

What do I say of a murmur?
That can no murmur be;
'Tis the water-nymphs, that are singing
Their roundelays unto me.

Let them sing, my friend, let them murmur,
And wander merrily near;
The wheels of a mill are going
In every brooklet clear.

TO MY SISTER

To My Sister was written by Heinrich Heine, a famous German lyric poet and critic. He was born in Düsseldorf in 1799, and died in Paris in 1856. As a middle-aged man he visited the house in which he was born, and wrote this poem. It is a splendid example of the delightful simplicity of his style. Like many other poets, he vividly recalls his childhood days.

MY child, when we were children,
Two children small and gay,
Who would creep into the hen-house,
And hide us in the hay,

We cackled like the young cockerels
And to everybody going,
"Cock-a-doodle-doo!"—we cried;
And they thought the cocks were crowing.

We spread old bits of carpet
On some chests within the court;
And there we lived together
In a house of the finest sort.

An old cat of our neighbors
Often came to make a call;
We made her bows and courtesies
And compliments and all.

We made very kind inquiries
About the health of our old friend;
Since then we have had to put the same
To old cats without end.

We used to sit conversing
In a solemn, elderly way,
Complaining, how much better
Things had been in our day;

How Love, Truth, and Religion
One hardly ever met;
How coffee had grown very dear
And money hard to get.

They all are gone—the little games
We played at in our youth,
And money, and the good old times
And Religion, Love, and Truth.

THE CASTLE BY THE SEA

This poem is by Ludwig Uhland, and at the time in which he lived Germany was divided into many small principalities. These were constantly at war with one another. The castle so beautifully described is Germany trying to stand against the tyranny of the government. The daughter is Freedom, who no longer lives with her parents in the lordly castle by the sea.

HAST thou seen that lordly castle,
That castle by the sea!
Golden and red above it
The clouds float gorgeously.

And fain it would stoop downward
To the mirrored waves below;
And fain it would soar upward
In the evening's crimson glow.

Well have I seen that castle,
That castle by the sea,
And the moon above it standing,
And the mist rise solemnly.

The winds and waves of ocean,
Had they a merry chime?
Didst thou hear, from those lofty chambers
The harp and the minstrels rhyme?

The winds and the waves of ocean,
They rested quietly;
But I heard on the gale a sound of wail,
And tears came to mine eyes.

And sawest thou on the turrets
The King and his royal bride,
And the wave of their crimson mantles,
And the golden crown of pride?

Led they not forth in rapture
A beauteous maiden there,
Resplendent as the morning sun,
Beaming with golden hair?

Well, I saw the ancient parents,
Without the crown of pride.
They were moving slow in weeds of woe,
No maiden was by their side.

REST

These thoughts in verse are from the great German poet Goethe—the greatest of all German poets and writers, and one of the giants of European literature. He lived between 1749 and 1832. These six lines are worth careful study as an instance of compression of thought. Nine thoughts are expressed in less than fifty words in this fine little poem.

REST is not quitting the busy career;
Rest is the fitting of self to one's sphere.

'Tis the brook's motion clear without strife;
Fleeting to ocean after its life.

'Tis loving and serving the highest and best;
'Tis onward, unswerving, and this is true rest.

THE ERL KING

Goethe tells the story of a father bringing home his sick child, who, in his delirium, believes that the branches of the trees are the Erl king and his daughters trying to seize him. The Erl king, according to German legends, is the spirit which dwells in the willow tree. You will find more about this great German poet on page 6410.

WHO rides there so late through the night
—dark and drear?
The father it is, with his infant so dear.
He holdeth the boy tightly clasped in his arm.
He holdeth him safely, he keepeth him warm.

"My son, wherefore seek'st thou thy face thus
to hide?"
"Look, father, the Erl king is close to our side!
Dost thou see not the Erl king with crown
and with train?"
"My son, 'tis the mist rising over the plain."

"Oh, come, thou dear infant—oh, come thou
with me!
Full many a game, I will play there with thee;
On my strand, lovely flowers their blossoms
unfold.
My mother shall grace thee with garments of
gold."

"My father, my father, and dost thou not hear
The words that the Erl king now breathes in
mine ear?"
"Be calm, dearest child, 'tis thy fancy deceives;
'Tis the sad wind that sighs through the with-
ering leaves."

"Wilt go then, dear infant, wilt go with me
there?
My daughters shall tend thee with sisterly
care,
My daughters by night their glad festival keep,
They'll dance thee, and rock thee and sing
thee to sleep."

"My father, my father, and dost thou not see,
How the Erl king his daughters has brought
here for me?"
"My darling, my darling, I see it aright,
'Tis the agèd gray willows deceiving thy sight."

"I love thee, I'm charmed by thy beauty, dear
boy!
And if thou'rt unwilling, then force I'll em-
ploy."
"My father, my father, he seizes me fast.
Full sorely the Erl king has hurt me at last."

The father now gallops, with terror, half wild.
He grasps in his arms the poor shuddering
child,
He reaches his courtyard with toil and with
dread,
The child in his arms finds he motionless, dead.

LOVE, DEATH, AND REPUTATION

This little fable appears in a collection of Charles and Mary Lamb's verses for children. It is probably by Charles Lamb, and is a poetic translation of a fable told in an old play of Queen Elizabeth's time. Its lesson is one of the most important we can learn—never to lose our good reputation.

ONCE on a time, Love, Death, and Reputation,
Three travelers, a tour together went;
And, after many a long perambulation,
Agreed to part by mutual consent.

Death said: "My fellow tourists, I am going
To seek for harvests in th' embattled plain;
Where drums are beating, and loud trumpets blowing,
There you'll be sure to meet with me again."

Love said: "My friends, I mean to spend my leisure
With some young couple, fresh in Hymen's bands;
Or 'mongst relations who, in equal measure,
Have had bequeathèd to them house or lands."

But Reputation said: "If once we sever,
Our chance of future meeting is but vain:
Who parts from me must look to part for ever,
For *Reputation lost comes not again.*"

SONNET

In this sonnet William Wordsworth gave voice to discontent with his own age that was given up to material things.

THIS world is too much with us: late and soon,
Getting and spending, we lay waste our powers;
Little we see of nature that is ours;
We have given our hearts away,—a sordid boon!
This sea that bares her bosom to the moon,—
The winds that will be howling at all hours,
And are up-gathered now like sleeping flowers—
For this, for everything, we are out of tune;
It moves us not. Great God! I'd rather be
A Pagan, suckled in a creed outworn:
So might I, standing on this pleasant lea,
Have glimpses that would make me less forlorn;
Have sight of Proteus rising from the sea,
Or hear old Triton blow his wreathèd horn.

MEMORIES

Henry Wadsworth Longfellow here points out that beautiful things and pleasant things never die, for their roots endure.

OFT I remember those whom I have known
In other days, to whom my heart was led
As by a magnet, and who are not dead,
But absent, and their memories overgrown
With other thoughts and troubles of my own,
As graves with grasses are, and at their head
The stone with moss and lichens so o'erspread,
Nothing is legible but the name alone.
And is it so with them? After long years,
Do they remember me in the same way,
And is memory pleasant as to me?
I fear to ask; yet wherefore are my fears?
Pleasures, like flowers, may wither and decay,
And yet the root perennial may be.

TO THOMAS MOORE

In this pledge to Thomas Moore it appears as though Lord Byron was thinking as much of himself as of his friend.

MY boat is on the shore,
And my bark is on the sea;
But, before I go, Tom Moore,
Here's a double health to thee!

Here's a sigh to those who love me
And a smile to those who hate;
And, whatever sky's above me,
Here's a heart for every fate.

Though the ocean roar around me,
Yet it still shall bear me on:
Though a desert should surround me,
It hath springs that may be won.

Were't the last drop in the well,
As I gasped upon the brink,
Ere my fainting spirit fell,
'Tis to thee that I would drink.

With that water, as this wine,
The libation I would pour
Should be—Peace with thine and mine,
And a health to thee, Tom Moore.

SUDDEN LIGHT

The celebrated poet and painter Dante Gabriel Rossetti was born in London, May 12, 1828, and died in 1882. His best-known poetry is the hundred sonnets entitled The House of Life, and the Blessed Damozel. He became one of the leaders of the Pre-Raphaelite Brotherhood.

I HAVE been here before,
But when or how I cannot tell:
I know the grass beyond the door,
The sweet keen smell,
The sighing sound, the lights around the shore.

You have been mine before,—
How long ago I may not know:
But just when at that swallow's soar
Your neck turn'd so,
Some veil did fall,—I knew it all of yore.

Has this been thus before?
And shall not thus time's eddying flight
Still with our lives our love restore
In death's despite,
And day and night yield one delight once more?

THE THRESHOLD

This charming verse expresses the desire common to us all, to remain akin to childhood in spite of lengthening years.

LIFE lies before me, but shut is the door
On all my childish days. No more, no more
Shall I in all my years again be free
And careless—happy as I used to be.
So be it, Lord! I know that all is right;
I would not alter it, or shirk the fight.
Shut then the door!—but leave a little crack
That when I meet a child I may slip back!

WARREN'S ADDRESS TO THE AMERICAN SOLDIERS

Was there ever a boy who did not thrill at Warren's Address to the American Soldiers? It was written by John Pierpont, a Unitarian clergyman (1785–1866).

STAND! The ground's your own, my braves!
Will ye give it up to slaves?
Will ye look for greener graves?
Hope ye mercy still?
What's the mercy despots feel?
Hear it in that battle-peal!
Read it on your bristling steel!
Ask it,—ye who will.

Fear ye foes who kill for hire?
Will ye to your homes retire?
Look behind you! they're afire!
And, before you, see
Who have done it!—From the vale
On they come! And will ye quail?—
Leaden rain and iron hail
Let their welcome be!

In the God of battles trust!
Die we may,—and die we must;
But, O, where can dust to dust
Be consigned so well,
As where Heaven its dews shall shed
On the martyred patriot's bed,
And the rocks shall raise their head
Of his deeds to tell!

DESTRUCTION OF SENNACHERIB

Lord Byron wrote a number of beautiful poems, which he called Hebrew Melodies, because he sought to express in them the feelings of the Hebrew people in their ancient days of struggle with the pagan nations around them. In this fine poem, which is one of the series, he describes with great power and imagination, and yet in plain, unaffected language, the defeat of Sennacherib, the great Assyrian king, who sought in vain to conquer the people of Israel.

THE Assyrian came down like the wolf on the fold,
And his cohorts were gleaming in purple and gold;
And the sheen of their spears was like stars on the sea,
When the blue wave rolls nightly on deep Galilee.

Like the leaves of the forest when summer is green,
That host with their banners at sunset were seen:
Like the leaves of the forest when autumn hath blown,
That host on the morrow lay wither'd and strown!

For the Angel of Death spread his wings on the blast,
And breath'd on the face of the foe as he pass'd;
And the eyes of the sleepers wax'd deadly and chill,
And their hearts but once heaved, and for ever grew still!

And there lay the steed with his nostril all wide,
But through it there roll'd not the breath of his pride;
And the foam of his gasping lay white on the turf,
And cold as the spray of the rock-beating surf.

And there lay the rider, distorted and pale,
With the dew on his brow, and the rust on his mail;
And the tents were all silent, the banners alone,
The lances unlifted, the trumpet unblown.

And the widows of Ashur are loud in their wail,
And the idols are broke in the temple of Baal;
And the might of the Gentile, unsmote by the sword,
Hath melted like snow in the glance of the Lord!

THE LEAVES AND THE WIND

"COME, little leaves," said the wind one day,
"Come o'er the meadows with me and play;
Put on your dresses of red and gold,
Summer is gone, and the days grow cold."

Soon as the leaves heard the wind's loud call,
Down they came fluttering, one and all;
Over the brown fields they danced and flew,
Singing the soft little songs they knew.

"Cricket, good-bye, we've been friends so long!
Little brook, sing us your farewell song!
Say you are sorry to see us go:
Ah! you will miss us, right well we know.

"Dear little lambs, in your fleecy fold,
Mother will keep you from harm and cold;
Fondly we've watched you in vale and glade;
Say, will you dream of our loving shade?"

Dancing and whirling, the little leaves went;
Winter had called them, and they were content.
Soon fast asleep in their earthy beds,
The snow laid a coverlet over their heads.

—GEORGE COOPER.

SERENADE

This beautiful little Serenade was written by our well-loved poet Henry Wadsworth Longfellow, and has been put to music.

STARS of the summer night!
Far in yon azure deeps,
Hide, hide your golden light!
She sleeps!
My lady sleeps!
Sleeps!

Moon of the summer night!
Far down yon western steeps,
Sink, sink in silver light!
She sleeps!
My lady sleeps!
Sleeps!

Wind of the summer night!
Where yonder woodbine creeps,
Fold, fold thy pinions light!
She sleeps!
My lady sleeps!
Sleeps!

Dreams of the summer night!
Tell her, her lover keeps
Watch! while in slumbers light
She sleeps!
My lady sleeps!
Sleeps!

THE GIFT

The Canadian-born poet Bliss Carman here expresses the great truth that to gain all we can from life by unceasing activity is good, provided that we spend what we gain on a wise love of our fellow-men.

I SAID to Life, "How comes it,
With all this wealth in store
Of beauty, joy, and knowledge,
Thy cry is still for more?

"Count all the years of striving
To make thy burden less,
The things designed and fashioned
To gladden thy success!

"The treasures sought and gathered
Thy lightest whim to please;
The loot of all the ages,
The spoil of all the seas!

"Is there no end of labour,
No limit to thy need?
Must man go bowed for ever
In bondage to thy greed?"

With tears of pride and passion,
She answered, "God above!
I only want the asking
To spend it all for love!"

TO ANTHEA, WHO MAY COMMAND HIM ANYTHING

In 1674 two great English poets died—John Milton and Robert Herrick. Though the former is the more illustrious, Herrick is not unworthy to be mentioned with him. He attempted nothing on the grand scale, but there are few, if any, lyrics more exquisite than his.

BID me to live, and I will live
Thy Protestant to be;
Or bid me love, and I will give
A loving heart to thee.

A heart as soft, a heart as kind,
A heart as sound and free
As in the whole world thou canst find,
That heart I'll give to thee.

Bid that heart stay, and it will stay
To honour thy decree;
Or bid it languish quite away,
And 't shall do so for thee.

Bid me to weep, and I will weep,
While I have eyes to see:
And having none, yet I will keep
A heart to weep for thee.

Bid me despair, and I'll despair,
Under that cypress tree;
Or bid me die, and I will dare
E'en death, to die for thee.

Thou art my life, my love, my heart,
The very eyes of me,
And hast command of every part,
To live and die for thee.

DEATH UNDREADED

DEATH stands above me, whispering low
I know not what into my ear:
Of his strange language all I know
Is, there is not a word of fear.

—W. S. LANDOR.

JENNY KISSED ME

Leigh Hunt, throughout all the ups and downs of his long and varied career—he died in 1859, in his seventy-fifth year—seems always to have been bright and cheery. His essays rank next to those of Charles Lamb, and, though sometimes sneered at as the leader of the "Cockney School" of poets, he wrote dainty verse with such a light and happy touch that these effusions, at all events, are sure of a permanent place in any collection of English poetry.

JENNY kissed me when we met,
Jumping from the chair she sat in;
Time, you thief, who love to get
Sweets into your list, put that in!
Say I'm weary, say I'm sad,
Say that health and wealth have missed me,
Say I'm growing old, but add,
Jenny kissed me.

DAYBREAK

Longfellow at his best was a people's true poet, and that is the secret of his universal popularity. He is not the poet of this country or of that, but of all countries where English is read. Moreover, he is the poet of the young as well as of the old, of woman as well as of man—the poet of the home. This great popularity he owes to his gift of sweet song, to his power of expressing his thoughts in clear language, to his absence of conceit and mannerism. The various aspects of the dawn are beautifully displayed in the accompanying lines.

A WIND came up out of the sea,
And said: "O mists, make room for me!"

It hailed the ships, and cried: "Sail on,
Ye mariners, the night is gone!"

And hurried landward far away,
Crying: "Awake! It is the day!"

It said unto the forest: "Shout!
Hang all your leafy banners out!"

It touched the wood-bird's folded wing,
And said: "O bird, awake and sing!"

And o'er the farms: "O chanticleer,
Your clarion blow; the day is near!"

It whispered to the fields of corn:
"Bow down, and hail the coming morn!"

It shouted through the belfry tower:
"Awake, O bell, proclaim the hour!"

It crossed the churchyard with a sigh,
And said: "Not yet; in quiet lie."

THE BARGAIN

This beautiful little poem by Sir Philip Sidney, who died so heroically at Zutphen in 1586, is a choice illustration of the fanciful conceits of which English poets of the period were so fond. It is a pretty comment on the proverb that "A fair exchange is no robbery."

MY true love hath my heart, and I have his,
By just exchange one for the other given:
I hold his dear, and mine he cannot miss;
There never was a better bargain driven:
My true love hath my heart, and I have his.

His heart in me keeps him and me in one,
My heart in him his thoughts and senses guides:
He loves my heart, for once it was his own,
I cherish his because in me it bides:
My true love hath my heart, and I have his.

LATE LEAVES

Poets often find a source of inspiration in the seasons of the year. To Walter Savage Landor the fall of the leaf brought a sense of profound melancholy. No doubt the deep sadness they express corresponded with his own experiences. Autumn in his own life was long, for he was eighty-nine years old when he died, in 1864.

THE leaves are falling; so am I;
The few late flowers have moisture in the eye;
So have I, too.
Scarcely on any bough is heard
Joyous, or even unjoyous, bird
The whole wood through.
Winter may come: he brings but nigher
His circle (yearly narrowing) to the fire
Where old friends meet.
Let him; now heaven is overcast,
And spring and summer both are past,
And all things sweet.

THE OLD CLOAK

It is a bitter night in winter. Bell, the farmer's wife, cannot sleep for thinking of poor old Crummie, the cow. So she urges the farmer to get up to save Crumbock's life. But the goodman does not relish the prospect of leaving his warm bed to go out into the blast, and pleads that his cloak is too worn to be of use to him in such weather. He must have a new cloak, he declares. But his wife sticks to her point bravely, and at last he takes his old cloak about him, and sets out to save the cow. This subject is worked out, in dialogue form, in the fine old Scottish ballad here given. A few words call for explanation. *Boreas* is the north wind: *to spill* here means to perish; *flyte* is to scold, *crické*, cricket; *renne*, run (the suggestion being that the coat is so dreadfully thin and threadbare that it won't bear the weight of a cricket); *ken*, know; *lown*, dunce, rascal; *threap*, argue with some degree of bitterness.

THIS winter's weather it waxeth cold,
And frost it freezeth on every hill,
And Boreas blows his blast so bold
That all our cattle are like to spill.
Bell, my wife, she loves no strife;
She said unto me quietlye:
"Rise up, and save cow Crumbock's life!
Man, put thine old cloak about thee!"

He

O Bell, my wife, why dost thou flyte?
Thou kens my cloak is very thin.
It is so bare and over-worn,
A crické thereon cannot renne.
Then I'll no longer borrow nor lend;
For once I'll new apparell'd be.
To-morrow I'll to town and spend;
For I'll have a new cloak about me.

She

Cow Crumbock is a very good cow;
She has been always true to the pail;
She has helped us to butter and cheese, I trow;
And other things she will not fail.
I would be loth to see her pine,
Good husband, counsel take of me:
It is not for us to go so fine—
Man, take thine old cloak about thee!

He

My cloak it was a very good cloak,
It hath been always true to the wear;
But now it is not worth a groat—
I have had it four-and-forty year.
Some time it was of cloth in grain,
'Tis now but a sigh clout, as you may see;
It will neither hold out wind nor rain,
And I'll have a new cloak about me.

She

It is four-and-forty years ago
Sine the one of us the other did ken;
And we have had, betwixt us two,
Of children either nine or ten.
We have brought them up to women and men,
In the fear of God I trow they be
And why wilt thou thyself misken?
Man, take thine old cloak about thee!

He

O Bell, my wife, why dost thou flyte?
Now is now, and then was then.
Seek now all the world throughout,
Thou kens not clowns from gentlemen.
They are clad in black, green, yellow, and blue,
So far above their own degree.
Once in my life I'll take a view,
For I'll have a new cloak about me.

She

King Stephen was a worthy peer;
His breeches cost him but a crown;
He held them sixpence all too dear,
Therefore he called the tailor "lown."
He was a king and wore the crown,
And thou'se but of a low degree.
It's pride that puts this country down—
Man, take thine old cloak about thee!

He

Bell, my wife, she loves not strife,
Yet she will lead me, if she can;
And to maintain an easy life
I oft must yield, though I'm goodman.
It's not for a man with a woman to threap,
Unless he first give o'er the plea:
As we began, so will we keep,
And I'll take my old cloak about me.

OFT IN THE STILLY NIGHT

Thomas Moore (born, 1779; died, 1852) did for the delightful Irish airs, or tunes, what Robert Burns did for so many of those of Scotland—that is, he wrote suitable words for them. The present is a much-admired example of the poet's work. Its theme is very simple—the memory of the years of happy boyhood.

OFT in the stilly night,
Ere Slumber's chain has bound me,
Fond Memory brings the light
Of other days around me:
The smiles, the tears, of boyhood's years;
The words of love then spoken;
The eyes that shone,
Now dimm'd and gone;
The cheerful hearts now broken!
Thus in the stilly night,
Ere Slumber's chain has bound me,
Sad Memory brings the light
Of other days around me.

When I remember all
The friends, so link'd together,
I've seen around me fall,
Like leaves in wintry weather,
I feel like one who treads alone
Some banquet-hall deserted,
Whose lights are fled,
Whose garlands dead,
And all but he departed!
Thus, in the stilly night,
Ere Slumber's chain has bound me,
Sad Memory brings the light
Of other days around me.

SHUFFLE-SHOON AND AMBER-LOCKS

BY

EUGENE FIELD

Shuffle-Shoon and Amber-Locks
Sit together, building blocks;
Shuffle-Shoon is old and grey,
  Amber-Locks a little child;
But together at their play
  Age and youth are reconciled,
And with sympathetic glee
Build their castles fair to see.

"When I grow to be a man,"
So the wee one's prattle ran,
"I shall build a castle so—
  With a gateway broad and grand;
Here a pretty vine shall grow,
  There a soldier guard shall stand;
And the tower shall be so high,
Folks will wonder, by-and-by!"

Shuffle-Shoon quoth: "Yes, I
    know;
Thus I builded long ago!
Here a gate, and there a wall,
  Here a window, there a door;
Here a steeple wondrous tall
  Riseth ever more and more!
But the years have levelled low
What I builded long ago!"

So they gossip at their play,
Heedless of the fleeting day.
One speaks of the Long Ago
  Where his dead hopes buried
    lie;
One with chubby cheeks aglow
  Prattleth of the By-and-by;
Side by side they build their
    blocks—
Shuffle-Shoon and Amber-Locks.

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THE PEN AND PENCIL OF KATE GREENAWAY

Although many artists have devoted themselves to the dainty art of illustrating and writing children's books, perhaps Kate Greenaway, who was born in 1846 and died in 1901, is the only woman who became famous all the world over in this way. She was the daughter of a London wood-engraver, and studied art from her earliest years. There is such a charm and freshness about all her little drawings, and so quiet a touch of humor, that both old and young find them entertaining. Selections from her work are given on these two pages and elsewhere by permission of the publishers, Frederick Warne & Company.

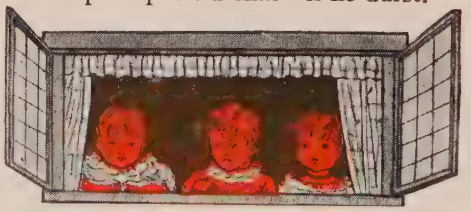
LOOK over the wall, and I'll tell you why:
The King and the Queen will soon pass by.
Madams and masters, look this way;
The King and his Court ride past to-day.

The Queen has a robe that is gold and red;
She is stately, and sits with a crown on her head;
And four very little boys after her go,
To do as she bids them—they never say "No."

The banners are waving, the soldiers are drumming;
'Tis indeed a fine sight that, I tell you, is coming!
So, if you look long enough over the wall,
You'll see a great deal, if you do not see all.

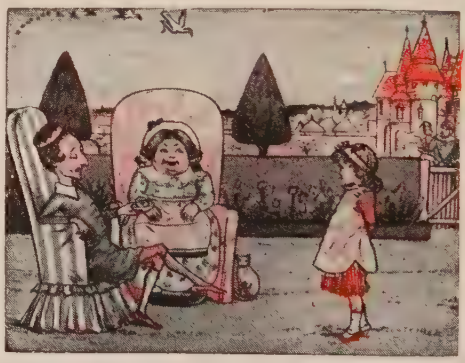
UNDER the window is my garden,
Where sweet, sweet flowers grow;
And in the pear-tree dwells a robin,
The dearest bird I know.

Tho' I peep out betimes in the morning,
Still the flowers are up the first,
Then I try and talk to the robin,
And perhaps he'd chat—if he durst.



PRINCE FINIKIN and his mamma
Sat sipping their bohea;
"Good gracious!" said his Highness,
"why,
What girl is this I see?

"Most certainly it cannot be
A native of our town."
And he turned him round to his mamma,
Who set her teacup down.



But Dolly simply looked at them;
She did not speak a word.
"She has no voice," said Finikin;
"It's really quite absurd."

Then Finikin's mamma observed,
"Dear Prince, it seems to me,
She looks as if she'd like to drink
A cup of my bohea."

So Finikin poured out her tea,
And gave her currant-pie.
Then Finikin said: "Dear mamma,
What a kind Prince am I!"

THREE little girls were sitting on a rail.
Sitting on a rail,
Sitting on a rail;
Three little girls were sitting on a rail,
On a fine hot day in September.

What did they talk about that fine day,
That fine day,
That fine day?
What did they talk about that fine day,
That fine hot day in September?

The crows and the corn they talked about,
Talked about,
Talked about;
But nobody knows what was said by the crows,
On that fine hot day in September.

FIVE little sisters walking in a row;
Now, isn't that the best way for little girls to go?
Each had a round hat, each had a muff,
And each had a new pelisse of soft green stuff.

Five little marigolds standing in a row;
Now, isn't that the best way for marigolds to grow?
Each with a green stalk, and all the five had got
A bright yellow flower and a new red pot.

POLLY'S, Peg's and Poppety's
Mamma was kind and good;
She gave them each, one happy day,
A little scarf and hood.

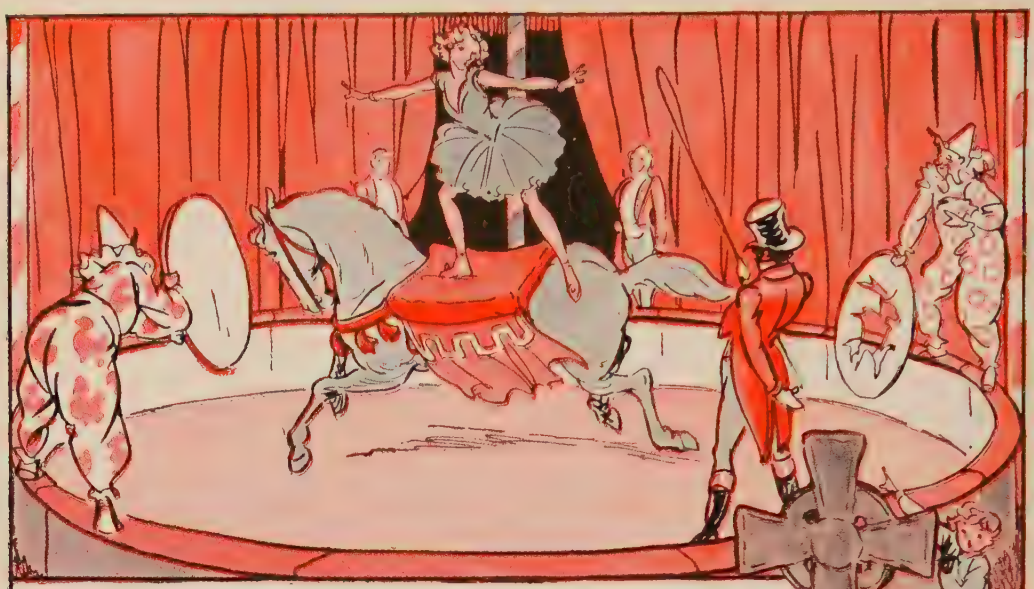
A bonnet for each girl she bought,
To shield them from the sun;
They wore them in the snow and rain,
And thought it mighty fun.

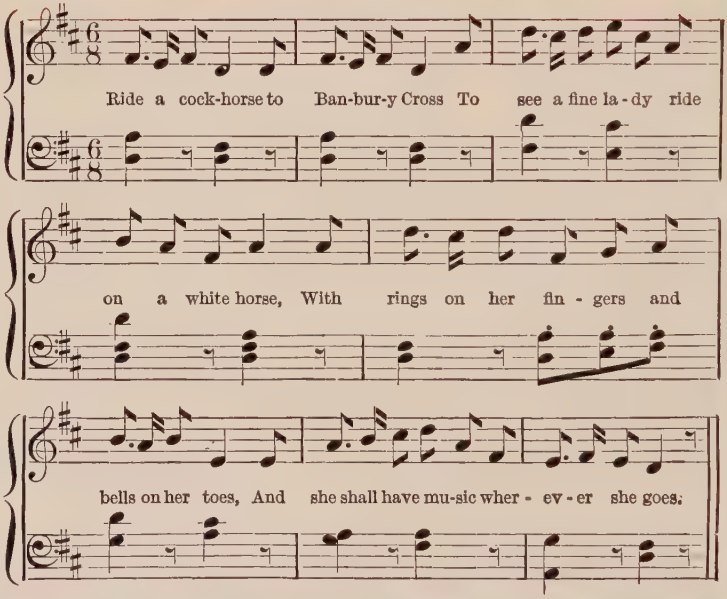
But sometimes there were naughty boys,
Who called to them at play,
And made this rude remark: "My eye!
Three Grannies out to-day!"

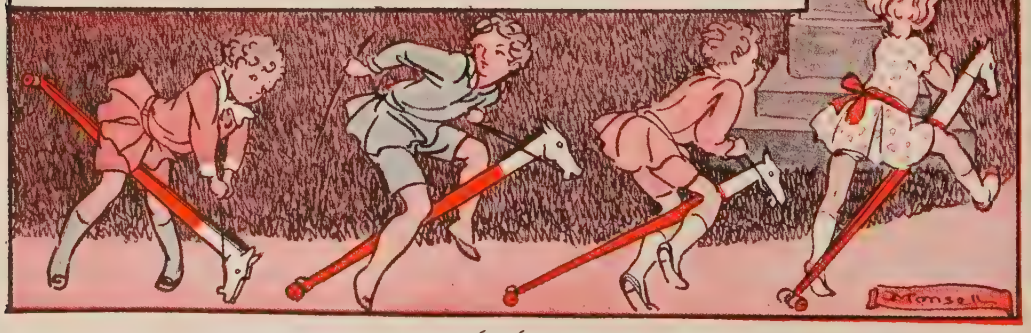
LITTLE Miss Patty and Master Paul
Have found two snails on the garden wall.
"These snails," said Paul, "how slow they walk!
A great deal slower than we can talk.
Make haste, Mr. Snail, travel quicker, I pray;
In a race with our tongues you'd be beaten to-day."

THREE tabbies took out their cats to tea,
As well-behaved tabbies as well could be;
Each sat in the chair that each preferred,
They mewed for their milk, and they sipped and purred.
Now, tell me this, as these cats you've seen them—
How many lives had these cats between them?

RIDE A COCK-HORSE




Ride a cock-horse to Ban-bur-y Cross To see a fine la-dy ride
on a white horse, With rings on her fin-gers and
bells on her toes, And she shall have mu-sic wher-ev-er she goes.



THE MILLER AND HIS PETS

CONTINUED FROM 6953

A LONG time ago a band of robbers settled in a hut on a lonely heath. They waylaid travelers and took their money, and broke into farmhouses and robbed the farmers. One afternoon, when the old miller who lived in the windmill on the edge of the heath had gone to town, the robbers entered his rooms, stole all his savings and set fire to the mill.

The old miller returned in the evening and found that he was ruined. But what grieved him most of all was that the robbers had stolen all his provisions. He did not mind going without a meal himself, but there was no food for his donkey, his dog, his cat and the two ducks. Being a lonely man, he had made great pets of all his animals. He loved them very dearly, and, rather than see them starve, he resolved to set them free. So he said to them:

"You see the robbers have taken everything. There is no hay for the donkey, no meat for the dog, no milk for the cat, no grain for the ducks. I can't keep you here, my pets, and let you die for want of food. Go out together, and see if you can't pick up something to eat on the heath."

All the animals were very sad at leaving their master, and they wandered about looking for food and lodging. At last they came to the hut where the robbers were sitting at a table eating their supper by the dim light of a tallow candle.

"Here's a chance to get a good shelter for the night," said the dog. "Crouch down in the bushes, all of you, and make as much noise as you can. See if we can't frighten these thieves out of their senses."

The animals hid themselves in the brushwood around the hut, and began to make a fearful racket.

"Hee-haw, hee-haw!" bellowed the donkey, with a voice like thunder.

"Mee-ow-u-ou!" shrieked the cat.

"Bow-wow-grr!" roared the dog.

"Qua, qua, qua!" squawked the ducks.

The robbers were greatly frightened by the strange uproar; and when one of the ducks flew in and knocked the candle over and left the hut in darkness, the men were terror-stricken, and they rushed out and fled wildly in all directions.

The animals then joyfully entered the hut, and made a good meal out of the robbers' supper, and then lay down to sleep. The donkey slept by the door, the dog underneath the table, the cat above it and the two ducks on the top of the open door.

When the robbers recovered from their fright, their captain determined to see what had happened at the hut.

He went back, and, finding the place very dark and silent, he crept through the open door, but the animals at once awoke.

The dog sprang out and bit his leg. As he passed the table, the cat jumped up and scratched his face. The two ducks spread out their wings and flapped about his head, and when at last he staggered to the door, the donkey gave him a terrific kick, and sent him flying into a prickly bramble bush. The robber captain crawled away, and told his men that a murderous gang had captured their hut and would kill them if they went back.

"One of them," he said, "stabbed me in the leg. Another just managed to graze my face with his knife. Three or four of them flapped a cloth about my head trying to wrap it round me and stifle me. And just as I thought I had got safely away, someone struck me in the back with a great sledge-hammer, and very nearly killed me."

"We'd better leave this neighborhood at once," said his men.

They hurried away, more frightened than ever, and never did they return to the heath.

In the morning, the dog noticed that the ground had been disturbed in a corner of the hut. Scratching up the earth, he found a large sack full of money. This the donkey managed to hoist on his back, and the dog and the cat and the two ducks proudly marched by his side across the heath to the ruined mill. With the money that the animals brought to him, the old miller repaired and stocked his mill, and there he lived happily and quietly with all his pets, and often amused himself over the story of the capture of the robbers' treasure.

A SON OF A GUN

SCREWWORM sat down amongst the toadstools and opened the book which is called Gnome Gnobodies. In America we have a book called Who's Who. It tells us about famous people. In fairyland they have Gnome Gnobodies, which is just the opposite.

In Gnome Gnobodies the gnomes read about gnomes who are not famous.

Screwworm opened his enchanting book at the letter T, and turned the pages till he came to the name Tompin. This is what he read:

"Tompin is a duffer and flighty. He was born on the planet Mars in the year 12, and emigrated to the earth in the year 1066. As he was neither woman nor man, he attached himself to the Normans, and followed them to England. His favorite recreation is stroking his chin. He neither reads nor writes. He earns his living by doing nothing. His favorite residence is the muzzle of naval guns, which he prefers to old-fashioned clubs. He can swim backward as well as forward. His address at present is A. Dreadnought, At Sea."

When Screwworm had read this account of Tompin, he said: "That's the little fellow for my money. The very thing."

Something stirred at his side. He looked up and saw the Lizard.

"Good evening," said Screwworm.

"Certainly," answered the Lizard.

"How did you find Landsend?"

"Rocky," replied the Lizard.

"Now listen to me," said Screwworm, resting his arm on a toadstool and regarding the Lizard over his glasses. "Do you, or do you not, know Tompin?"

"I've seen him," answered the Lizard, "but I can't say that I know him. We don't speak. He's a son of a gun."

"Quite so. Now, I've invented a gun myself; it's a beauty. It fires seashells on the seashore. The shells are sells; that is to say, the seashells it sells are seashore sells. Not Wilkie's, for those are Bard—but Winkle's! Do you follow?"

"You mean to say, your gun fires winkle-shells which are sells; that is to say, they are not genuine. You are using slang?"

"You have me. I use slanguage for this reason—the mouth of my gun likes it. If you want to make a hit nowadays, you must use slang. I want to make a hit. Do you know what I want to hit?"

"Hush!" whispered the Lizard. "He's here!"

Screwworm turned his head. Tompin was regarding him over a toadstool.

"Good evening, monsieur. Do you speak German?" asked Screwworm.

Tompin said nothing. His old face had a set smile, which was neither merry nor pleasant. You might have called it a blind smile, or even a dumb smile.

6669

SOMETHING STIRRED AT SCREWWORM'S SIDE, AND, LOOKING UP, HE SAW THE LIZARD

"Don't you speak at all?" demanded Screwworm, frowning.

After waiting a long time for an answer, Screwworm got up, laid Gnome Gnobodies on the ground, and, walking over to Tompin, said: "Come hither, little bird!" Very gently he took the left ear of the old fellow between his finger and thumb and led him away.

"Monsieur," said he, "I have a gun."

Tompin stopped dead. His face quite lighted up.

"What's the matter?" asked Screwworm.

"I am saved," said Tompin—"if it's at all fatherly."

"Explain yourself."

"The Navy," said Tompin, "is practicing gun-fire just now. There is not a single gun that is safe for me to sit in. The consequence is—"

"Yes?"

"I am an orphan, a waif, a homeless and fatherless wretch. It is immensely sad."

"You are welcome to sit in my gun. It shall adopt you."

"It won't go off—and leave me?"

"I shouldn't think so."

"Oh, thanks! For this relief, much thanks. Get you to a gunnery, as Shakespeare says. I'm your boy. Let us fly to it."

They continued their way. When they came to Screwworm's gun, the face of Tompin became very green.

"It smells fishy!" he said suspiciously.

"Try it," said Screwworm.

"I don't like the smell," muttered Tompin, poking his nose in the muzzle and sniffing deeply. "It suggests seashells. Too much mussel to be strong. I fear I might be oystered. If you will allow me, I will limpet."

He started to go on, but Screwworm caught him by the ear again, and said: "Try it, poor orphan."

"You are sure you don't mind?" asked Tompin.

"Tut!"

"Here goes, then!" cried Tompin; and he jumped into the muzzle of Screwworm's gun.

Quick as lightning Screwworm ran to the back of it, struck a match, and applied it to the touch-hole.

A bright flame shot into the air.

Something went *fiz-z-z-z-z!* And then there was a tremendous explosion.

The air for miles became black with winkle-shells.

Thousands and thousands of gnomes came rushing up from all directions. They found the gun lying on the ground, smoking hot, and emitting yellow and green flames. Screwworm and Tompin were nowhere to be seen.

Scramblepipe, who was among the company, exclaimed:

"Something has happened!"

At that moment the Lizard appeared in the midst of the group.

"My dear friends," said he, "if you will be patient for a few moments, you will see a sight worth seeing. Let me explain. This gun is so perfectly balanced that the pace of the discharge is equal to the pace of the recoil. The force is exactly equal to the circumference of the earth. Now, what has happened? Tompin from the muzzle of the gun and Screwworm from the breech of the gun are now at this moment going round the world. Do you follow me? If you wait a moment, you will witness the force of my meaning."

Scarcely had the Lizard ceased speaking when Tompin from the east and Screwworm from the west appeared in the air, rushing toward each other at a pace so furious that all the gnomes instantly rushed for shelter under the toadstools.

"They passed each other halfway round the world," said the Lizard. "Now they will meet and embrace. Bang!"

At that minute the two bodies came together with a whack! Then they fell straight to the earth clasped in each other's arms.

"Did you enjoy it?" asked Screwworm breathlessly.

"You have impressed me," said Tompin, with sincere admiration.

For a moment he regarded the gun, still smoking on the ground; then, with a rush of tears to his eyes, and quite overcome with emotion, he fell upon one knee, laid his arms lovingly about the gun, and, pressing his cheek against it, exclaimed:

"Papa, papa, I have come back to you!"

The Lizard turned to Screwworm, and said:

"Let us leave him where he is. The poor orphan is now at peace."

THE WONDERFUL FRIENDS

A SHEPHERD lad was once sent by his father to carry food to his elder brothers, who were in the army of the king, encamped before a powerful enemy. When the young boy arrived, he found everywhere dismay and anxiety. For the champion of the other side had challenged any of their host to combat, and so mighty was he that none had dared to answer.

"Who is this man," inquired the shepherd lad, "that he should defy the armies of the living God?" He offered to go himself, and was brought before the king, and the king, after speaking to him, had him dressed in his own armor. But the lad said: "I cannot go with these, for I have not proved them." And he put them by. Then he took his shepherd's staff and his sling, gathered some smooth stones from the brook, and went out to meet the champion.

When Goliath, the mighty warrior, saw him, he was enraged, and cursed him in contempt. But the young patriot replied: "You come to me with a sword and a spear and a shield: but I come to you in the name of the Lord of hosts, the God of the armies of Israel, whom you have defied. This day will the Lord deliver you into my hand." And as the warrior bore down upon him he fitted a stone to his sling, and, whirling it about his head, let fly. The stone struck Goliath on the forehead, and he stumbled and fell upon his face to the earth. Then the lad snatched the fallen hero's sword and smote off his head. When the Philistines saw their champion was dead, they fled. But among the Israelites in an instant despair had changed to confidence and enthusiasm.

With a shout of joy, the army of Israel arose, and flinging itself upon the enemy, drove them away in utter confusion.

Then Saul, king of Israel, inquired about the shepherd boy, but none knew his name. "Inquire whose son the stripling is," he said; and presently the boy was brought before him, with the head of the giant in his hand, to answer for himself. "I am the son of thy servant Jesse the Bethlehemite."

Beside the king was his son, and this gracious young man, regarding the shepherd boy as he spoke to his royal father, felt his soul suddenly knit with the handsome lad's, and there and then loved him as his own heart. So he spoke to the king, and the king said that the lad David should no more return to his father's home, but should live with him in his palace, and be a soldier instead of a shepherd. And the king's son, Jonathan, took off his royal robe and put it upon David, and gave him his sword, his bow and his girdle. And he held David's hand and looked in his eyes, and they made a vow together of a friendship which should last till death.

Life had changed utterly and completely for David in an instant. From living in a humble cot he went to live in a king's palace. From being a shepherd of the hills he became a captain of soldiers.

What dreams of glory must have crowded the lad's brain! It seemed as if there was no height to which he might not soar, no fame he might not earn, no happiness he might not enjoy.

In all the glory and honor which now invested him, there was one thing far more gracious and more glorious than all the rest, and this was the deep love of the king's son for him. Clothed in such a love, as with a kingly robe, the young David was something more than warrior and hero.

What Julius Cæsar was to the Romans, what Napoleon was to the French army, this, and more, was David to the hosts of Israel. The spell of the man's *soul* was over the people, and in him they beheld a captain from heaven, whose right hand was terrible with victory. So wherever David went with the army triumph followed, and on the return of the soldiers the streets were loud with his name and with music in his honor.

In this glory of young David, Jonathan rejoiced with all his noble and generous nature.

But the people shouted: "Saul has slain his thousands, and David his ten thousands!" And this cry pierced the king's chamber and struck on his soul like the voice of Destiny. From that day Saul regarded David with growing jealousy.

Slowly it came to the mind of the king that David was his enemy. At first he had been envious of the praise showered

upon his favorite; then he became suspicious. He thought of the youth as plotting for the throne of Israel.

He spoke about this idea to Jonathan and his courtiers, saying that David was dangerous to the royal house. But Jonathan, after he had warned David to lie in secret for a little space, went to the king and spoke so convincingly of David's honor and of his service to the nation that the king put away his suspicion, and said: "As the Lord liveth, he shall not be slain." So David returned to the court and lived as before.

But in a war that soon followed, David was again so successful that the king's suspicions returned, and with his own hand, on a sudden impulse of hatred, as he sat with his successful captain, most basely the king sought to kill him with a javelin. Then David fled away from the court that night and went back to his own house.

Jonathan came to him in secret, and the two friends comforted each other. Then Jonathan returned to soften the king's wrath against David. But when he spoke to Saul, the king this time burst

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THE STONE FROM DAVID'S SLING STRUCK FULL IN THE GIANT'S FOREHEAD

out upon him with violent rage, bidding him see that he would never succeed to the throne while David lived; and admonishing him to throw aside a treacherous friend and to try to protect his own interests while there was still time.

To all this Jonathan replied: "Why should he be killed? What has he done?" And this gentle answer so enraged the king that he hurled his javelin even at Jonathan.

Then Jonathan saw that it was in vain for him to plead, and that it was unsafe for David to be within reach of his father's arm. So he approached David in secret and warned him by a signal agreed upon by them beforehand, namely that Jonathan would shoot three arrows as if at a mark. If he said to his attendant, "The arrows are beyond thee," it would mean that his news was bad. David, hearing these words, bowed his head to the ground and waited for Jonathan.

When Jonathan came near, he took David into his arms, and they kissed one another, and wept together, till David could bear no more.

Then Jonathan comforted the mighty conqueror, valuing his friendship more than life. "Go in peace," said he; "go in peace, because we have vowed both of us."

Many years afterward, when David, having gone through a multitude of adventures, was become a king himself, he heard how Saul and Jonathan had died together in battle. The news broke him down, and he cried out: "The beauty of Israel is slain!" Forgetting his own wrongs that he had suffered at the hands of Saul, he said: "Saul and Jonathan were lovely and pleasant in their lives, and in their death they were not divided."

Then the old friendship with Jonathan, with all its fragrance of innocence and youth, returned to him, and he mourned for his friend: "I am distressed for thee, my brother Jonathan. Very pleasant hast thou been unto me. Thy love to me was wonderful!"

THE KING'S SON FELT HIS SOUL SUDDENLY KNIT WITH THE SOUL OF THE HANDSOME LAD

SPREADING OUT HIS WINGS, CUPID FLEW AWAY

Psyche was so beautiful that Venus, the Spirit of Beauty, hated her, and sent Cupid to marry her to the ugliest creature on earth. But Cupid fell in love with her and married her in the dark, forbidding her to gaze on his face. One night Psyche lit a lamp; a drop of oil falling on Cupid awakened him and he fled.

THE KING'S DAUGHTER IN THE MOUNTAIN

THE STORY OF CUPID AND PSYCHE

IN the ancient days there lived in Greece a king who had three daughters; Psyche, the youngest daughter, had really remarkable beauty.

When she passed through the streets people threw down flowers for her to walk on. They worshiped her. But when the time came for her to marry, the king was commanded by a mysterious voice to take her to a wild mountain and leave her there.

"Alas," cried the people, "our lovely Psyche is about to be sacrificed!"

And so, indeed, she was. The people had said that Psyche was more beautiful than Venus herself. Now, Venus was the Spirit of Beauty, and because what the people said was true, Venus was very angry. She had a son named Cupid, who was the Spirit of Love, and she bade him marry Psyche to the ugliest creature on earth.

So when Psyche was placed on the mountain, a wind-fairy came and carried her to a strange palace. There the maiden was waited on by unseen spirits, who played sweet music and served her with delicious food. But in the dark night someone came and spoke tenderly to her, and she fell in love with him, and consented to be his wife.

Then he said: "Psyche, you may do what you will in this palace which I have built for you, but one thing you must not do: you must not try to see my face."

He was very sweet and kind to her, but as he came only in the night-time, Psyche felt very lonely in the day-time. One day the wind-fairy brought her sisters to see her, and they made her very unhappy. They told her that by command of Venus Cupid had married her to a monster.

"That's what your husband is!" they said. "And that's why he will not let you see his face!"

The next night Psyche lighted a lamp and looked at her sleeping bedfellow. He was Cupid, the winged and radiant Spirit of Love! In her joy Psyche tilted the lamp, and a drop of hot oil fell on his shoulder and aroused him.

"Ah, Psyche!" he cried. "We must part. My mother will now know that I fell in love with you, and instead of mating you to a monster, married you myself in secret. Farewell!"

And spreading out his wings, he flew away. In the morning Psyche bravely set out to follow him, and after sadly wandering over the world, she came to the palace of Queen Venus. There she remained as a servant, in the hope of seeing Cupid. But Venus recognized her, and being more angry with her than before, set her to dangerous tasks that might bring about her death. Psyche, however, was so gentle and lonely and sorrowful that everything on earth took her part and helped her. Then Venus laid a plot against her.

"Take the golden casket to the Queen of the Dead," she said, "and ask her to fill it with the magic ointment of beauty."

Psyche knew that no mortal had ever returned from the Land of the Dead, and in her despair she climbed a tower to throw herself down and die.

But the very stones took pity on her, and said: "Do not despair. You will find a way to the Land of the Dead on Mount Tartarus. Go there, and take two copper coins in your mouth and two honey-cakes in your hands."

Psyche gladly did so. She came to the Land of the Dead, and a ghostly ferry-man ferried her over the River of Death and took one of her copper coins. Then a horrible dog with three heads sprang at her, but she fed him with a honey-cake, and he let her pass. The Queen of the Dead filled the golden casket, and by means of the last honey-cake and the last copper coin Psyche returned to the green, bright earth.

Then she opened the casket to see what was inside. Alas, this was just what Venus had expected she would do! The casket was full of poisonous vapor which rushed up into Psyche's face and overcame her, so that she fell down on the grass. But Cupid had been watching her through all her trials, and now he flew to her aid and wiped the vapor from her face. Then, taking her in his arms, he spread out his wings and carried her up to the Land of Immortality. And there they still live together in unending joy.

THE STORY OF THE SLEEPING BEAUTY

ONCE upon a time all the fairies of the country were invited to the christening of a little baby Princess. Seven fairies came, and they acted as godmothers; and a feast was held in their honor. Just as the feast began an ugly old fairy appeared. Nobody had seen her for fifty years, and thinking that she had left the country, the King and Queen had not troubled to invite her. This made her very angry, and as she sat down she muttered: "Before I leave this place I will turn all their joy to sorrow."

Fortunately, the youngest fairy overheard the threat, and slipped away and hid herself behind a curtain.

When the feast was ended the other fairy godmothers came to the little Princess and gave her their christening gifts. The first fairy bestowed on her the gift of angelic beauty; the second, the gift of angelic goodness; the third gave her the gift of genius; the fourth, the gift of exquisite gracefulness; the fifth endowed her with the utmost sweetness of voice, and the last blessed her with every other gift.

"Hold! See, your gifts are useless!" cried the ugly old fairy. "For I give your godchild the gift of being pricked by a spindle and of dying from the wound."

The Prince strode through the castle gates and found the courtyard covered with horses and soldiers. And over all brooded an awful silence.

The King and Queen began to weep. But the youngest fairy sprang from behind the curtains and said: "Do not weep, my dear King and Queen. The Princess shall not perish. I cannot change entirely the spell which an older fairy has cast upon her. She will be pricked by a spindle. Yes! But instead of dying she will only fall into a sleep lasting a hundred years, and from that sleep she will be awakened by a kiss."

At once the King made a law forbidding everybody to use a spindle, and the Princess never saw one until she was sixteen years of age. Then, when climbing about one of her father's castles in the country, she came to a garret, and found there a simple old serving-woman spinning flax with a spindle and distaff. The Princess took up the spindle to look at it, the point ran into her hand, and she fell down in a deep sleep. The King and Queen summoned all their doctors, but none of them could awaken the Princess. In the mean-

time the youngest fairy arrived. She bade the King and Queen return to their palace, and leave all their courtiers in the castle. Then she dressed the Princess in a lovely robe and laid her in a golden chamber, and cast a spell upon every living thing in the place. A high, dense thicket of briers, thorns and brambles at once sprang up around it.

Many persons lost their lives in trying to force a passage through the trees, and at last no one dared to approach it. The King and Queen died without leaving an heir, a new line of kings began to reign, and in the wars and tumults of a hundred years the story of the Sleeping Princess was forgotten. At the end of that time the son of one of the new kings lost his way while out hunting, and wandered until he came to the Enchanted Castle. He asked who lived in this strange, lonely place. Some replied that it was the haunt of witches; others said it was the dwelling-place of a terrible ogre.

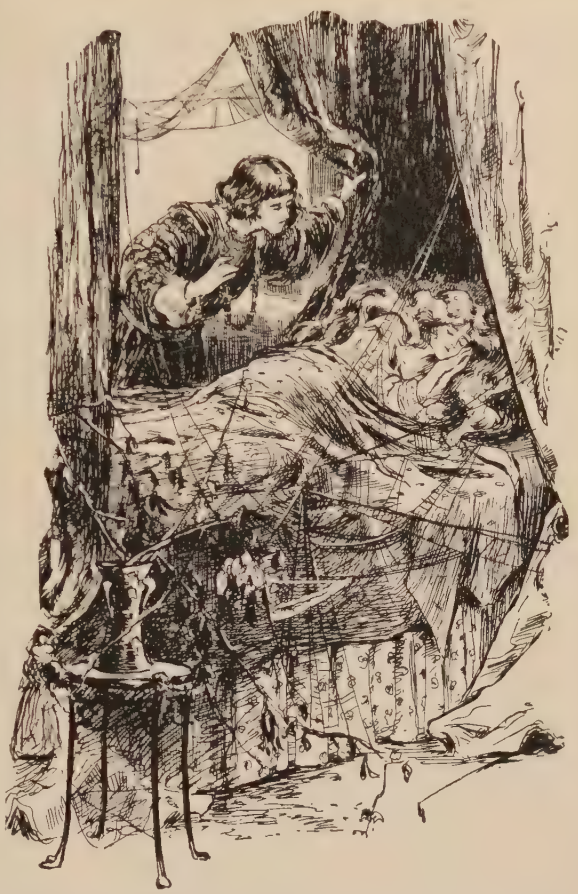
The Prince did not fear danger. He tied his horse to a tree, and, sword in hand, made his way to the castle.

He entered the wood, and the briers and thorns and great trees bent aside to let him pass, and he strode on through the gate of the castle. He found it a place of strange death. The courtyard was covered with the bodies of horses and dogs and soldiers. In the corridors lay waiting-maids and pages, serving-men and messengers, and in the rooms beautiful ladies were stretched beside tall knights and gallant courtiers.

The Prince trembled, but he did not turn back. Still striding on, he opened the door of the Golden Chamber, and there he saw a wonderful sight. In the middle of the chamber stood a great bed hung with rich curtains, and on the bed was a young Princess of angelic loveliness. Surely she lived? He leaned over the Sleeping Beauty to see if she breathed, and touched her lips with his. The Princess opened her eyes.

"Is that you, my Prince?" she said. "I have been waiting a long, long time."

They began to tell each other the story of their adventures, but they were soon interrupted. For every living thing in the castle had awakened with the Princess. The dogs barked, the cocks crew, and the soldiers took up their arms. The messengers ran along the corridors with messages given to them a hundred years ago, and upset the trays of the waiting-maids. The courtiers made love to the beautiful ladies, and the maid of honor entered the Golden Chamber and said the dinner cooked a hundred years ago was ready.



The Prince opened the door of the Golden Chamber. In the middle stood a great bed, and on it lay a young Princess.

Everyone went to the dining-hall as if the hundred years' sleep had been an afternoon nap. But the Prince and Princess were too happy to eat a bite.

Soon after they went to a little chapel in the Enchanted Castle, where they were married, and then set out for the palace of the King, where they were welcomed with wonder and joy.

THE BOY AT THE GIANT'S CASTLE

MANY years ago a boy wandered about the New Forest in England looking for some strayed sheep, and at last came to a giant's castle.

"I've eaten your sheep," roared the giant, "and if you're not careful I'll eat you. See how strong I am!" Saying this he took up a rock and squeezed it to bits.

"But can you wring water out of a stone?" said the boy. "See how much stronger I am!" And taking a piece of cheese out of his pocket, he pressed it until the whey ran out.

The giant was wonder-struck, and asked the boy to help him get some firewood. He found a great oak, and bent it down, and told the boy to hold it while he cut it. But when the boy tried to do so, the tree sprang up and sent him flying through the air.

"That's a favorite trick of mine," said the boy. "Can you leap as high as that?"

The giant would not try. When he had felled the oak, the boy said: "The root end's the heavier, so I will take that. You take the top end."

When the tree was balanced on the giant's shoulder, the boy jumped up and hid in the branches. The giant groaned under the burden, and staggering into the castle yard, threw down the tree wearily, and the boy leaped off and pretended that he had just let the root end fall.

"Surely you're not tired," said the boy. "I'm as fresh as when we started."

"If I don't kill this mighty creature to-night," muttered the giant, "he will master me in the morning. I will wait till sleep puts him at my mercy."

But the boy was too wide awake to go to sleep. He soaked his bolster with water, and put it in his bed, and waited behind the door. At midnight the giant entered and struck a blow at the bolster; then, as the water spurted into his face, he went away, saying: "Ha! That knocked all the blood out of him! He will trouble me no more."

The next morning the boy came gaily downstairs and said that a flee had bitten him in the night. The giant looked at him in terror. When breakfast came, he was still more terrified to see how much porridge the boy swallowed, and how fat he grew.

"How do you manage to eat so much?" he said.

"Well," said the boy, "after eating all I can, I cut myself open, and then begin to eat again."

The boy had tied the bolster-cover round his neck, under his clothes, and he poured the porridge there, instead of eating it. He now cut open the bolster-cover, and let out the porridge.

"That's really a good trick," said the giant. So, taking a great carving knife, he stabbed himself, and fell down dead, and the boy then became master of the castle and lord of its treasures.

THE BOY JUMPED INTO THE TREE, AND THE GIANT STAGGERED UNDER THE BURDEN

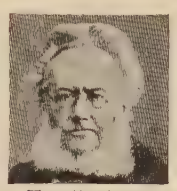
THE NEXT STORIES ARE ON PAGE 7215.

Björnson.

Swedenborg.

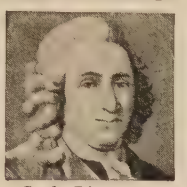
Adam Öhlenschläger.

Jonas Lie.


Henrik Ibsen.

H. A. Wergeland.

Ludvig Holberg.


Carl Linnæus.

Esaias Tegner.

Georg Brandes.

THE LITERATURE OF SCANDINAVIA

CONTINUED FROM 6011

BY Scandinavian literature we here mean the modern writings of Denmark, Norway and Sweden which are interesting and important; but we include also writings connected historically with the ancient language and stories of Iceland.

The languages of these three countries have been slowly growing more and more apart during the last thousand years. They started from a common ancestral language. That original language is the one still spoken, with comparatively little change, in Iceland. It has considerable literature that was preserved in men's memories by frequent recitation until about the time when William the Conqueror was reigning in England. Then it began to be written down, and was recorded on vellum and expanded during several centuries.

These ancient written stories, called sagas, exist in a language once in use in Denmark, Norway and Sweden, but now superseded by the Danish, Norwegian and Swedish developments of the old speech, so that they cannot be understood there except by special study. But in Iceland the original tongue of the Norse sea-rovers, who settled in the island over a thousand years ago, has been retained so faithfully that any Icelandic child can read and understand the tales told in the very words of their ancestors.

Thus the Scandinavian nations are in the position of having an ancient literature of their distant forefathers, for which they are indebted to their long-time-ago kinsmen in Iceland. It was chiefly Icelanders who told the stirring stories of the days when the race served strange gods of war. It was chiefly Icelanders, too, who preserved the stories when they had been written down, and thus preserved the ancient language. But those stories took whoever heard them away from Iceland into Norway and Denmark and Sweden, and they reveal to us to-day how the people in all these northern lands lived and thought and believed. The collections of sagas, called the Eddas, or "things said at the tale-tellings," are the ancient literature of all the northern peoples, including many who settled on the British coasts.

We must look at this ancient Norse literature a little more closely, for it shows us how poetry and history came into being everywhere, and it forms a mass of fanciful material from which poets and musicians of later times have selected the themes of their poems and dramas and operas.

The sagas go back into times dim with distance. They reveal to us the doings and beliefs of our forefathers before they had heard of Christianity, and also when they were hearing of it and it was changing their hearts and lives and hopes. They cover a period of three or four hundred years.

We do not know who wrote the sagas, except one or two of the latest. First there were tales about the ancient gods, prophecies, snatches of song, and proverbial sayings. Then, as men did heroic deeds and died, clever tale-tellers (the saga-men) described their lives, introducing their words at exciting moments, with now and then a song. The next step was to tell the deeds of living men, and preserve the genealogies of families.

The subjects of the sagas were often not good, according to Christian ideas. Bitter quarrels and revenge, admiration of strength and bravery as supreme qualities, disputes that led to primitive trials by law—these are the features of a rough, forceful life, ending heroically in unfeared death, which make up a large part of these ancient tales.

THE STIRRING TALES THAT WERE MEANT TO BE SPOKEN AND NOT READ

But they include much finely imaginative legend and varied poetry, even when the narrative is in prose, as is generally the case. They were made not to be read, but to be said, and the words swelled and sang in fine stirring sounds that had some of the effects of music or thrilling recitation. Often they were drama expressed in narrative form.

Listening to the saga-men telling stories of the past and present, with skill in the building-up of the tale, was the chief indoor amusement of the leaders of the Norsemen. A story having been told and retold till it had reached perfection in its form, perhaps after repetition by several generations, was finally written down. Thus it has reached us across the ages during which the old language has changed into Danish, Swedish and Norwegian.

Though we do not know who made up more than one or two of the forty sagas that have been preserved in Iceland, we do know who collected them and transmitted them to us. They are now preserved in the capitals of the present Scandinavian countries, a literature rescued from oblivion.

It was Ari Thorgilsson the Learned, who, living as a contemporary of William the Conqueror, wrote the Book of the Kings of Norway, and collected many sagas. He also wrote the Book of Settlements, mentioning four thousand people of his race and the places where they lived, and a book of the laws of Iceland.

THE MEN WHO PASSED ON THE SAGAS OF OLD

Snorri Sturlason, who lived a century after Ari Thorgilsson, continued the work of historian and saga-collector. He describes Ari as "a man wise and of good memory, and a speaker of the truth." He himself passed on his knowledge through the famous Sturlung family, who further continued the preservation of the old language and literature. Finally came the poet and historian Sturla Thordsson, who lived between 1215 and 1284.

Thus we see that before the perfecting of the new languages of the Scandinavian countries, and cut off from modern life by the Middle Ages during which those languages were growing, there existed one of the world's most curious and impressive literatures, secluded, as it were, in Iceland. It may seem curious that a race which found a voice so eloquently in the sagas should not continue the cultivation of dramatic and poetical speech. The truth is that literature almost lapsed in the Scandinavian countries for fully four hundred years.

THE INTERNATIONAL LANGUAGE OF LEARNING AND THE CHURCH

The explanation is that Christianity brought with it Latin as the language of the Church and as the international language of learning. Everyone who could write knew some Latin. The spoken language of the people came very slowly into literary use. This was more particularly so in the smaller nations. Latin was the highway of correspondence by which people reached the outside world. The larger nations used their own language in their books much more quickly than the smaller nations. English, through Chaucer, had become a literary tongue in the year 1400. But in Sweden the two most widely known Swedes—Swedenborg, who died in 1772, and Linnæus, who died in 1778—wrote their books to the last in Latin, and are not known as users of their native tongue, which, however, had been in literary use for some time.

Of the three northern countries, Denmark, Norway and Sweden, which have been linked together in history in varying ways, the first place in literature must be given to Denmark, though a remarkable number of writers who rank as Danish were really Norwegians. They had been drawn to Copenhagen when it was the educational centre of the Danish-Norwegian state, before Norway joined Sweden in 1814, on her way to complete independence in 1905.

THE NORWEGIAN WHO GAVE DENMARK A LITERATURE OF HER OWN

In poetry particularly the Norwegians have been conspicuous, as might be expected from the inspiration given by the rugged grandeur of their natural surroundings compared with the tameness of the Danish landscape. It was only when Norway was withdrawn from the Danish partnership that national pride suggested a distinctive literature for her.

The man who first gave Denmark (with Norway) a literature of her own was Baron Ludvig Holberg, a Norwegian born at Bergen in 1684. He went to the university of Copenhagen in 1702. Before the eighteenth century Danish literature consisted of ballads and hymns. It was said that a Danish gentleman wrote to his friends in Latin, talked to ladies in French, called his dogs in German, and swore at his servants in Danish. When Holberg died, in 1754, six years after he had been made a baron, he had written, in an attractive style, books on history, law, politics, science and philosophy, all in the national language, and he had furnished the first Danish theatre with thirty-six dramas from his own pen, while his poems covered a wide range in style and subjects. He was, in short, one of the greatest literary forces in Europe, and his influence has been felt in Denmark to this day.

THE WEALTH OF DANISH GENIUS IN THE EIGHTEENTH CENTURY

From such a start Denmark could not well go back, and the eighteenth century brought a succession of poets with lyrical genius of a high order. Christian Tullin, also a Norwegian, introduced the poetry of nature, inspired by Thomson's Seasons. Johannes Ewald wrote the first Danish tragedy, and a lyrical drama, The Fishers, which still lives as a national poem, while as a lyrical poet he remains unexcelled. He also revealed to the Scandinavian nations the neglected sources of their own early literature. Ewald died in 1781, at the age of thirty-seven, after a life tragically mismanaged.

Herman Wessel, another Norwegian, a brilliant but short-lived poet of genius, so ridiculed on the stage the revival of the pompous style of French tragedy that it was laughed out of fashion. In its place the national language and a national spirit were established there. Later, Jens Baggesen (1764–1826), the comic poet of Denmark, gave flexibility to the language by his satires and wit, but lessened his fame by the fierceness of his jealousies.

The most deservedly popular poet of the nineteenth century was Adam Öhlenschläger, who, by the power of his romantic appeal, ranks as a literary influence with Baron Holberg. Öhlenschläger went back for his subjects to the Icelandic Eddas. He so stirred the imagination of his countrymen that in 1829 he was crowned with laurel in Sweden as the "Scandinavian King of Song." His masterpiece is his tragedy Hakon Jarl.

Other notable poets were Steen Blicher, whose realistic pastoral verse has points of resemblance to Crabbe; Christian Winther, whose studies of country life and rural scenery recall Wordsworth; Henrik Hertz, a dramatist and lyrist of Jewish birth; and Frederik Paludan-Müller, a writer whose personal modesty and retiring nature contrasted with the keenness of his satire and the loftiness of his thoughts in his varied dramas.

THE PLACE OF A GREAT SCIENTIST IN THE LITERATURE OF HIS COUNTRY

It will be noted that much of the literary art of the Danes has been expended on the stage; but it has not been lacking elsewhere. For instance, Hans Christian Oersted, the discoverer of electromagnetism, and Denmark's greatest scientist, was also such a clear writer that, like Tyndall and Huxley in England, he claims a place in the literature of his country.

Again the Danish philosopher, Sören Kierkegaard (1813–55), is as notable for his command of style in writing as for the subtlety and originality of his thought.

Among novelists, Herman Frederik Ewald (1821–1908) must be named for his historical stories, and his son, Carl Ewald (1856–1908), not only for his finer fiction but, above all, for his unique

skill in teaching science and morals under the guise of fairy lore.

We have left to the last the names of the two men—one of the past and one of the present—who have distributed farthest throughout the world the finest fruits of the Danish mind. Hans Christian Andersen as a writer for children and Dr. Georg Brandes as a literary critic are in their different ways unsurpassed.

We read of Hans Andersen among the story-tellers on page 3194. He was born in poverty in 1805, and educated himself as a small boy by reading Holberg and Shakespeare. His formal education, after he had failed on the stage, was long and unsatisfactory; but his real education was in travel. No man ever understood himself less than he. He tried to be a poet, dramatist, novelist and descriptive writer, but with only moderate success. What he could write, but did not value, were his exquisite sketches of fairy lore and human character in his books for children. They won the heart of the whole world, and they have kept it and will keep it, for they are among the best literature of the kind ever penned and the choicest product of Danish literature.

THE CLEVER DANISH CRITIC WHO BELONGS TO THE WORLD

Georg Brandes, born in Copenhagen in 1842, is of Jewish origin. What country has he not visited? What literature does he not know? Of whom has he not written? He is the universal critic. He is as painstaking as a German and as clear and bright as a Frenchman. One could wish he had an even broader view than he has on some subjects of deepest interest to mankind, but as a literary critic he is undoubtedly the world's most learned expert. Though he is of Denmark, he belongs to the world.

The literature of Norway, apart from Denmark, does not really begin until the nineteenth century; but Norway had before that time a remarkable share in the joint literature of the two countries. A sense of national pride in her writers began to grow in Norway after the establishment of a university at Christiania in 1772. After 1814, when the political separation from Denmark was made, the demand for an independent Norwegian literature became insistent. For many years it took the unfortunate form of trying to separate the Danish and Norwegian tongues, though the literary form of the languages was the same, and Norway had contributed richly to its development. It was true that Norway had its own dialects, but they had no literature of any account.

Henrik Wergeland (1808–45), an impulsive young poet, son of a professor, carried his desire for a separate Norwegian tongue to such lengths that he tried to weld the various Norwegian dialects into a new tongue, leaving the joint Danish-Norwegian language to the Danes. In this he was helped by a poet, Aasmund Vinje (1818–70), who wrote peasant poetry in a rural dialect with attractive effect; and by a novelist, Arne Garborg, who wrote stories of country life in the peasant speech.

AN UNFORTUNATE QUARREL WHICH SPRANG FROM FALSE PRIDE

Then Johan Welhaven, who had some power as a descriptive poet, and far more as a bitter satirist, attacked Wergeland for disowning the language which had given Norway substantial fame. Gradually the view held by Welhaven prevailed, and Norway retained as her literary language practically the same tongue as Denmark, though there was a great increase of dialect fiction. It was an unfortunate quarrel springing from false pride.

Norway has always had an abundance of poets, but her increasing literary fame has been gained chiefly through fiction and the drama, though all the novelists and dramatists have touched poetry.

Her two writers most widely known throughout the world were managers of theatres during a considerable part of their lives, and the most famous of them, Henrik Ibsen, who lived from 1828 to 1906, made his great reputation entirely as a writer of plays.

Ibsen was very slow in gaining the recognition his remarkable literary gifts deserved. He was embittered by delayed success to such an extent that much of his writing is an exposure of his countrymen for being a smug, hypocritical, conventional, unromantic people who could not or would not appreciate life as he saw it. He was at war with a world that would not understand him. In the end he won, and he broadened his view as he succeeded, till he died in a blaze of triumph, with his statue erected in the capital of his country.

THE POWERFUL NORWEGIAN WRITER WHO WON HIS FIRST FAME ABROAD

The stormy character of Ibsen's career is accounted for by the fact that he was a critic of his fellow-men, and particularly of his own race. He persisted in showing what was mean and wrong in them. His was the power of exposing weaknesses, and he was in a rage with his countrymen because they did not like it. They, too, were often angry with him. Foreigners, who do not see Norwegians as Ibsen saw them, recognized the scathing cleverness of his plays, and presently his fame abroad exalted him in the eyes of Norwegians, and their pride in their son conquered their anger.

The son of a Bergen merchant, Ibsen was in his youth a gloomy apprentice to an apothecary, and a writer of romantic verse. Naturally he turned to journalism and then to the stage. In this his instinct was true, for no man has ever had a clearer understanding of how simple language can be used dramatically to produce great effects. His first great success was in a saga-drama, The Warriors in Helgeland. But it was in social dramas that Ibsen made his world-wide fame, his principal plays being Brand, Peer Gynt, The Master Builder, Pillars of Society, A Doll's House, Ghosts, An Enemy of the People, and Hedda Gabbler. In Peer Gynt, which was started as a satire on Norwegian weaknesses, Ibsen became mastered by his interest in his character-sketch, and reached the highest flight of his poetical power. As a lyrical drama Peer Gynt is further known through the music of the Norwegian composer Edward Grieg.

THE NOVELIST WHO PICTURED THE LIFE OF SCANDINAVIA'S PEASANT FOLK

The fashion for Ibsen is not now what it was, though always there have been admirers who have had reservations about his moral influence. Of the intensity of his genius few will doubt, but it lacks breadth. His plays show Ibsen at war with the world rather than interpreting it in a generous, understanding spirit.

Björnstjerne Björnson, who was born in 1832 and died at seventy-eight, was Norway's most widely known novelist. He was reared in the Romsdal, known to all tourists to central Norway, and after writing poetry as a boy he became a journalist, and then a manager of theatres —like Ibsen—at Bergen and Christiania. Björnson was a man with enormous vitality—a true poet, a writer of fine dramas, both social and heroic; an eager politician, eloquent and fearless. But he reached his highest distinction as a writer of stories of peasant life, with Arne of Synnöve as his masterpiece. He it was who turned the scale in the dispute over Norway's classical language. Admitting that the peasant life of Norway is its real life, he showed in his own writings that it can be more fully pictured in the literary language of the country than in the rural dialects, which have their interest and use, but are incomplete.

The most popular novelist in Norway itself has been Jonas Lie (1833–1908), who, after living as a boy in Tromsö, became a lawyer, turned to poetry, tried journalism and failed; but he won popularity by his pictures in well-observed detail of the life of the seafaring people of the Norwegian fiords. Jonas Lie's stories have won a large circulation by their truthfulness rather than by their literary power.

KNUT HAMSUN AND THE NOVELS THAT HAVE COME OUT OF HIS LIFE

Ibsen, Björnson and Jonas Lie all obtained from the Norwegian Parliament pensions for life as writers of national importance. Thus they were enabled to give their best work to their country and the world without anxiety as to their fate when old age came.

Recently, Norwegian fiction has received a new strength from the fine work of Knut Hamsun and Hans Aanrud, both of whom have the power of building up a gradually increasing impression of intense reality as they picture the life of their countrymen in closest touch with nature.

Knut Hamsun has been read much more extensively in English-speaking countries since he was awarded the Nobel Prize for Literature in 1920. The first of his novels to become fairly well known abroad was Hunger. It was an outcome of Hamsun's early experiences during a wandering life on both sides of the Atlantic, when he was depending on manual labor for a living. It was restless and impulsive, and lacked the steady thoughtfulness demanded by good art. It seemed to be an explosive outburst from an embittered man. But it attracted attention in his own country, and gained him a hearing that brought a deeper sense of responsibility.

Seldom has a novelist shown a greater change than Hamsun between the time when he wrote Hunger and the time when he wrote the book that won for him a well deserved European reputation—The Growth of the Soil. His hero in this fine story is a Norwegian peasant, who, with the slenderest resources, gets a footing on the soil, and with it a firm grip of life. The slow, firm progress of the man settled on the land seems to be the very counterpart of the author as he builds up his theme with strength and patience.

Dr. Nansen, the famous explorer and scientist, has a place also in the literature of his country through his epic narratives of adventure in Greenland and the Polar Seas and his account of the early Norse explorers who discovered America long before the days of Columbus.

Sweden has as long a literary history as Denmark. In its modern form, after a period producing chiefly folk lore, it began with Georg Stjernhjelm (1598–1672), who wrote a poem on Hercules. His writings covered a very wide range of subjects, mostly serious, but including masques, then a popular form of royal entertainment. He became poet laureate.

THE CLEVER COPYIST WHO WAS MUCH INFLUENCED BY ENGLISH WRITERS

Early Swedish literature was powerfully influenced from abroad, and was imitative, first of German and Italian, and then of French and English writers. The leading Swedish writer who wrote according to English models, and was the best writer after Stjernhjelm, was Olaf Von Dalin (1708–63). Addison, Pope and Swift were his models, and his style had a graceful finish like theirs. He wrote a History of the Swedish Kingdom and an epic poem on Swedish Freedom. He was a copyist, but a very clever copyist, and he decidedly added to Sweden's literature.

In the reigns of Gustavus III and Gustavus IV (1771–1809) literature flourished in Sweden. Gustavus III wrote some sound plays himself. But the writing of this period was conventional in style. Bellman, Oxenstjerna, Kellgren and Leopold had more originality as poets, and Kellgren and Leopold were writers of strong prose.

THE SAGA-POEM THAT CARRIED TEGNER'S FAME THROUGH EUROPE

Later Esaias Tegner (1782–1846) became the most widely known Swedish writer, his works being translated into all European languages. His patriotic poem Svea won the prize of the Swedish Academy and its author a university professorship. It was his Story of Frithiof, a saga-poem, that carried his fame through Europe.

A writer whose works vied in popularity with Tegner's poems was Fredrika Bremer (1801–65), a Finnish lady with a graceful pen, whose stories were translated into English by Mary Howitt. In later life Miss Bremer became an active philanthropist and an advocate of women's movements. Then she weakened her literary position by writing poems with a purpose.

The leading Swedish poet after Tegner has been Ludvig Runeberg (1804–77), a Finlander born. His poems tended to link Sweden and Finland together, and include most charming idyls of Finnish life. In drama he was less successful.

In connection with Finland we must mention Professor Elias Lönnrot, to whom the world owes the recovery from oblivion of the remarkable Finnish folklore poem Kalevala. This gave to Longfellow the rhythm used in his Hiawatha, and probably suggested the writing of that well-known poem.

The most widely discussed Swedish novelist is Johan August Strindberg, who has been nursed in the direction of a fashion by a certain type of critic. Strindberg is a fine literary workman, but a blunt realist in what is objectionable. He writes under the sway of a violent pessimism, and the world will not long cherish writing, however clever it may be, if it is strong and nasty.

Vernher von Heidenstam, lyrical poet, romantic novelist and thoughtful critic, has been a useful contrast to the pessimism of Strindberg.

A lady whom we must mention for her thoughtful essays and her striking writings on education is Miss Ellen Key (born 1849). Miss Key, whose ancestry was Scottish, was for many years lecturer on the history of civilization in the University of Stockholm, but became more widely known as a speaker on social reform and kindred subjects.

Miss Selma Lagerlöf, a winner of the Nobel Prize for Literature, has written many charming stories which are widely translated and internationally enjoyed.

THE NEXT STORY OF LITERATURE IS ON PAGE 7125.

Photo, courtesy Packard Motor Car Co.

A modern closed car.

HOW MOTOR CARS ARE MADE

CONTINUED FROM 6973

THE title of this story is really too large, for we cannot tell how motor cars are made in one story, or in a dozen, for that matter. The motor car as we see it in the streets consists of thousands of parts made from many different materials. It is manufactured in great shops with the aid of much complicated machinery. We shall try, however, to give you an idea of the way a car is put together.

A motor car is simply a car that moves of itself. A locomotive is a motor car, and so is a steam roller. We now mean by the words, however, a car that travels on an ordinary road and carries passengers or freight. In fact, we usually mean a passenger car, and call the freight car a motor truck. Most of them are run by gasoline engines, though there are many electric cars, and a few steam cars.

The idea is not new. Over two hundred years ago Sir Isaac Newton thought of the idea, and in 1770 a Frenchman built two steam cars which ran. Other men built cars in England. All of them were very heavy and very clumsy and soon went out of use. For a long time men had to depend upon horses to carry them about.

Not until the internal-combustion engine was invented did men again try to make a motor car. You know the difference between an engine of this kind and a steam engine. In the latter, heat is applied on the outside of the boiler to make steam, which pushes out the pistons of the engine. In the former, gas is admitted to the cylinders and set on fire. The explosion drives out the pistons. On pages 7030 and 7031 you will find a splendid diagram which shows you how a four-cylinder engine works.

It seems that the first fairly successful internal-combustion engine was made by a German, Dr. Nicholas Otto, who lived near Cologne. He was assisted by Gottlieb Daimler, who about ten years later made an engine for himself and attached it to a bicycle. So we see that really the motor cycle came before the motor car. Soon many men were experimenting and trying to attach an engine to a vehicle.

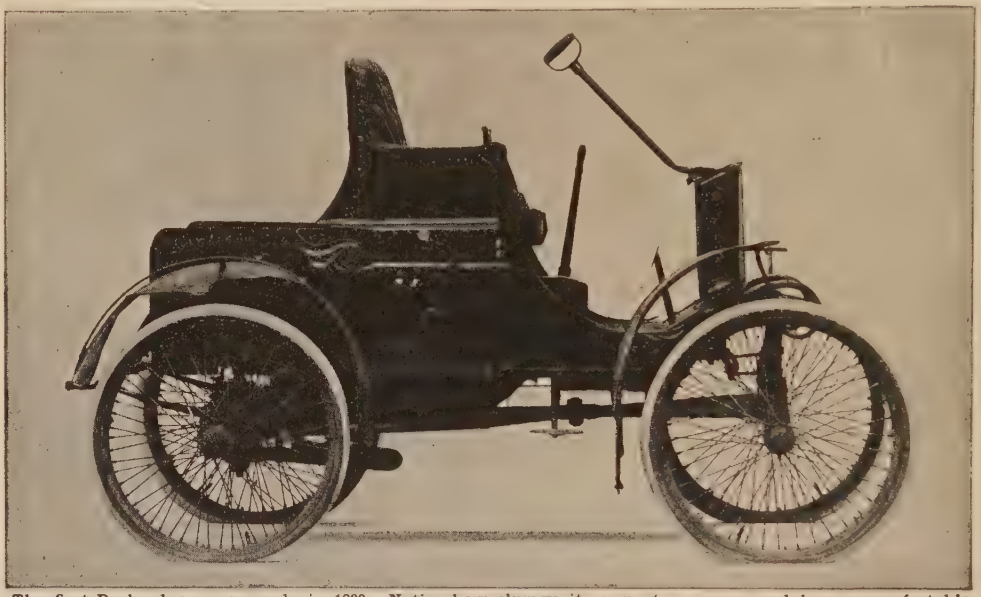
These engines were not perfect. The first and the second had only one cylinder, and they often got out of order, but men worked on them for years, and many improvements were made. When such engines began to work well, the motor car as we know it became possible. No one man can be given the credit for the engine. It is not even certain who first thought

of the idea, but our motor cars, motor boats and airplanes all depend upon it.

Though Europe took the lead in the development of motor vehicles, the United States was not far behind. Frank Duryea, Elwood Haynes, Alexander Winton and Henry Ford are some of the men who before 1895 made cars that would run, and others followed. Winton and Ford are still active manufacturers, and now the United States has more cars in use than all the remainder of the world together.

In making the first motor cars men tried to make them as much like vehicles drawn by horses as possible. On this page we show you a picture of a car made in 1899. Later, when better roads were made, so that the body could hang lower, the wheels were made smaller, and they were fitted with pneumatic tires which made riding much easier. In the beginning the engine often got out of order, and the sight of a car being pulled into town by horses was a common occurrence. Reliable cars were not manufactured until after 1900. Many inventions have gone into the car, until now it seems as if there is little more to be done.

In a great factory there are several departments. Some manufacturers buy some or all of their metal parts already cast, but others melt their own iron, steel and brass, and cast the parts they need. This operation is very interesting and is about the same, no matter what the metal. Boxes without top or bottom are prepared. One is filled nearly full of a particular kind of sand which is kept just a little moist. Then a pattern, generally made of wood, though sometimes of metal, is laid on it. A second box is placed above the other and sand is filled in around the pattern and packed closely. Then the upper box with its sand may be lifted off, even though it has no bottom. The pattern is then taken out of the lower box. The upper box is then replaced above the other. The sand holds its shape, and inside the boxes is a hollow the exact size and shape of the pattern. The molten metal is then poured through a hole left for the purpose and fills up the mold. When the metal has cooled, the sand is taken away, and the part is taken out.



The first Packard car was made in 1899. Notice how clumsy it seems to us now, and how uncomfortable it must have been. Compare it with the picture on the preceding page, which represents a recent model.

Some of the castings go to great ovens where they bake for hours. This makes them stronger or tougher. Some go to machines which pound them and shape them; some go to be polished or to be joined to still other parts. There are thousands of separate parts in a motor car, and one cannot keep up with them all.

More motor cars are manufactured in the United States than anywhere else, and it has the largest single factories. They make cars of different prices, from a few

hundred to many thousands of dollars. All, whether they make cheap or expensive cars, use much machinery. In the shops there are machines larger than an ordinary room. Some stamp out great pieces of metal as if they were so much cheese. Lathes cut off shavings of steel as if they were soft wood. Some machines grind pieces that were purposely made a little too large until they are the proper size. Some of these parts must be accurate to a thousandth of an inch. Some machines drill holes into steel, a dozen or twenty at a time, all exactly the right distance apart. It would be almost, if not quite, impossible to drill them so accurately by hand. Others cut cogs into wheels so that they fit exactly. There are hundreds of machines in the different rooms, and they work with wonderful precision.

In the woodworking rooms saws, planers and shapers are buzzing. Spokes and rims for wheels are being made. Holes are being bored or cut, and one part fits into another without a hitch. The wooden parts of the body are being put together before your eyes. There are great paint rooms where wood and steel are being covered. Much of the painting is done by a spray, but for some parts work with a brush is necessary. There are upholstering rooms where the cushions for the seats and backs are being fastened on.

How the different parts are put together

So far you have not seen anything which looks much like a motor car. You have seen thousands of pieces of iron, steel, brass, bronze, nickel, wood, rubber and leather—some large, some small—which you are told are required to make a car, but that is all. How they can ever be put together you cannot understand. Let us go to one of the assembling rooms and see what we can see there. This is a room where parts are assembled, or put together. We wander into the room where engines are being assembled. We find here something like an engine raised conveniently above the floor. Part after part is added until the complicated machine, built as delicately as a watch, is completed. Yet, strange to say, it is so well made that it seldom gets out of order. We are told that each is taken to another room, tested in every possible way, and then made to run for hours.

Let us now go to another room and see how the car itself comes together. Men take the two long side bars and quickly fasten the crosspieces which hold them together. The bare frame may be placed in a truck which is drawn slowly and steadily along by a chain or belt. As it passes, gangs of men attach the metal parts—springs, brackets to support the running-boards, a muffler, the axles, and dozens of other things. A spray of naphtha cleans off all oil or dirt, and paint is sprayed on. The frame disappears into a drying room. When it appears on the other side it gets a coat of varnish, goes through another hot room, and is then left to cool.

It resumes its journey. The engine is swung down from a loft, up from below, or comes along another track, and is fastened firmly to the frame, which we now call a chassis. Some manufacturers now test the chassis to see that all is right. Others wait until the car is complete and test it on the road. In such a factory the truck continues to move. To one side is a large stock room where thousands of parts are piled up in convenient reach. Each man, or set of men, attaches something as the car moves along. The body swings down from above. The wheels, tires, lamps, the clock suddenly appear. Perhaps a man rides on the car, working all the time until his job is done. Then he drops off and goes back to the place where he started, to begin again. If you ever get an opportunity to see how Ford cars are made, do not fail to take advantage of it. They are put together with wonderful speed.

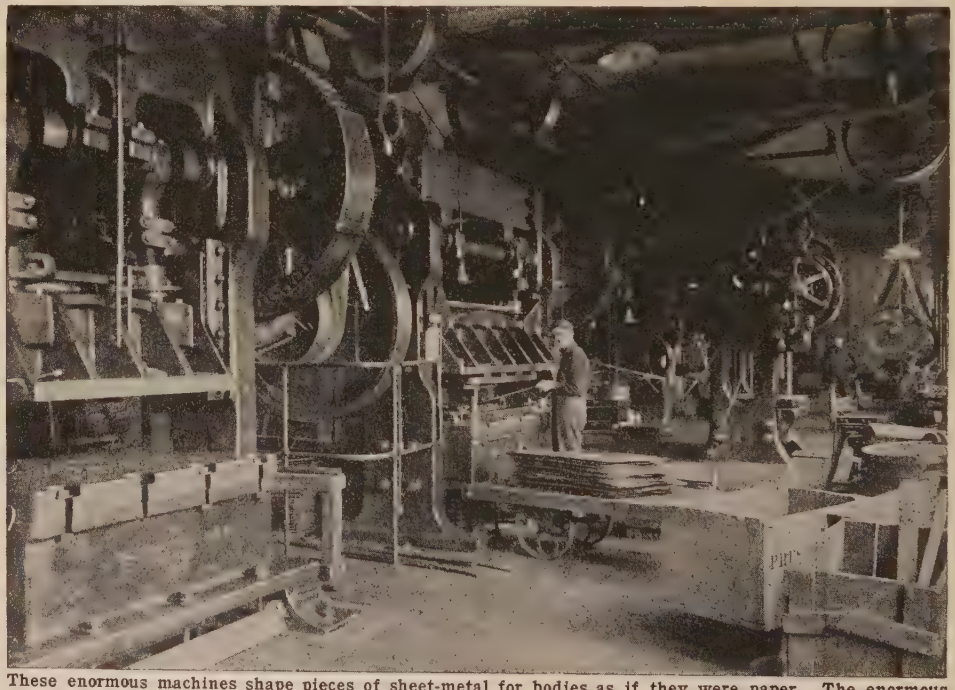
The car has finally traveled a long distance. Every few yards an inspector has tested some part. It now comes to the end and is rolled off on the floor. Fill the tank with gasoline and it is ready for the road.

The modern motor car, no matter whether cheap or expensive, is a great achievement. Though made up of thousands of parts which must work together if the car is to run perfectly, it is surprising how seldom anything gets out of order. It would seem that only an expert machinist could manage such a complicated machine, but it is so well built that we see many men and women without such knowledge or skill who successfully run cars day after day.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 7131.

MOLDING AND STAMPING PARTS FOR CARS

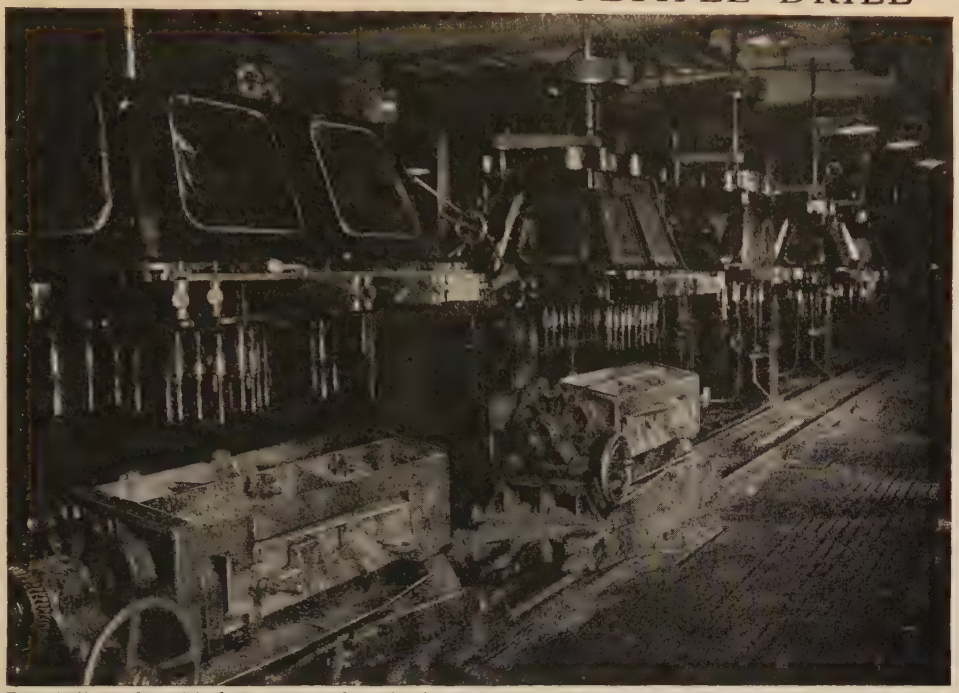
The process of molding is always interesting even if it is difficult to show in pictures. Here you see the men about to tap the cupola to let the melted metal run out into the large iron vessel. It is poured into these boxes of sand. As explained in the text, each contains an open space the size and shape of some part of a car which is filled by the molten metal from the great ladle.



These enormous machines shape pieces of sheet-metal for bodies as if they were paper. The enormous jaws can bite the sheets of metal in two, or bend them to any shape desired. They exert so much force that they would flatten your watch or your ring as thin as a piece of paper.

Pictures on pages 7018, 7020, 7021, and the lower half of 7023 courtesy Cadillac Motor Car Company.

THE WORK OF THE MULTIPLE DRILL

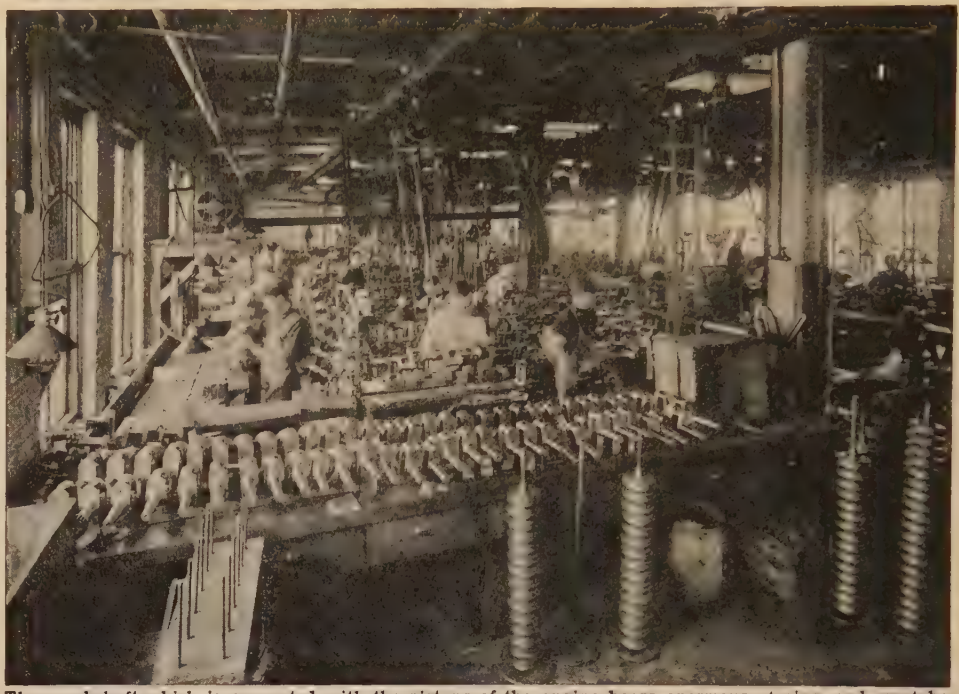


This drill can be set to bore any number of holes in a piece of iron or steel. The part of the car in which the holes are to be made is placed on the traveling carriage, and at the pleasure of the operator the drills descend and bore the holes in an instant. Drilling the holes by hand would take a long time and they would not be so accurately spaced as by the machine.

Here you see a section of a workshop engaged in producing rear axles. On the left, bolts are being placed in holes which have been drilled by the machines above, and on the right, men are at work on the same part.

Pictures on pages 7015, 7016, 7019, bottom of 7022 and top of 7023 courtesy Packard Motor Car Company.

OTHER VIEWS IN THE MACHINE SHOPS



The crankshaft which is connected with the pistons of the engine bears enormous strains, and must be perfect. Here you see on the left shafts receiving the final polish, and in the centre the inspector is measuring them. He must take about twenty-five measurements, and at some places the shaft must be accurate to the thousandth of an inch. This paper is three times that in thickness.

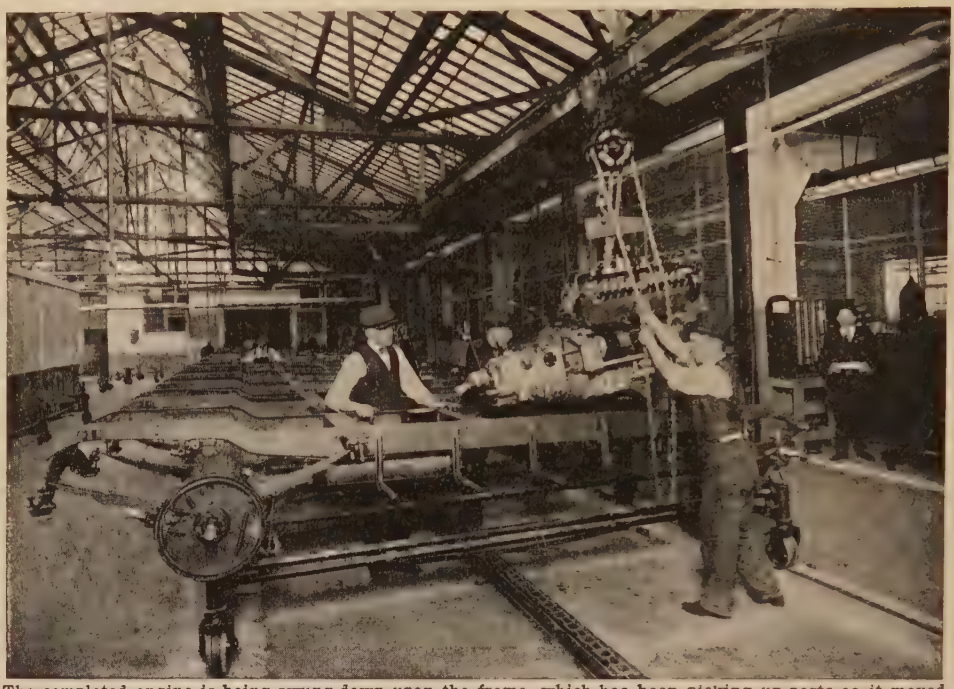
Much of the body of the car is made of thin sheets of metal which have been stamped to the proper size and shape by the great machines shown on page 7018. Here you see the workmen putting the final touches on many different parts. Perhaps you can recognize where some of them belong in a completed car. Some are brass, some steel, and some perhaps are aluminum.

BUILDING AND TESTING ENGINES

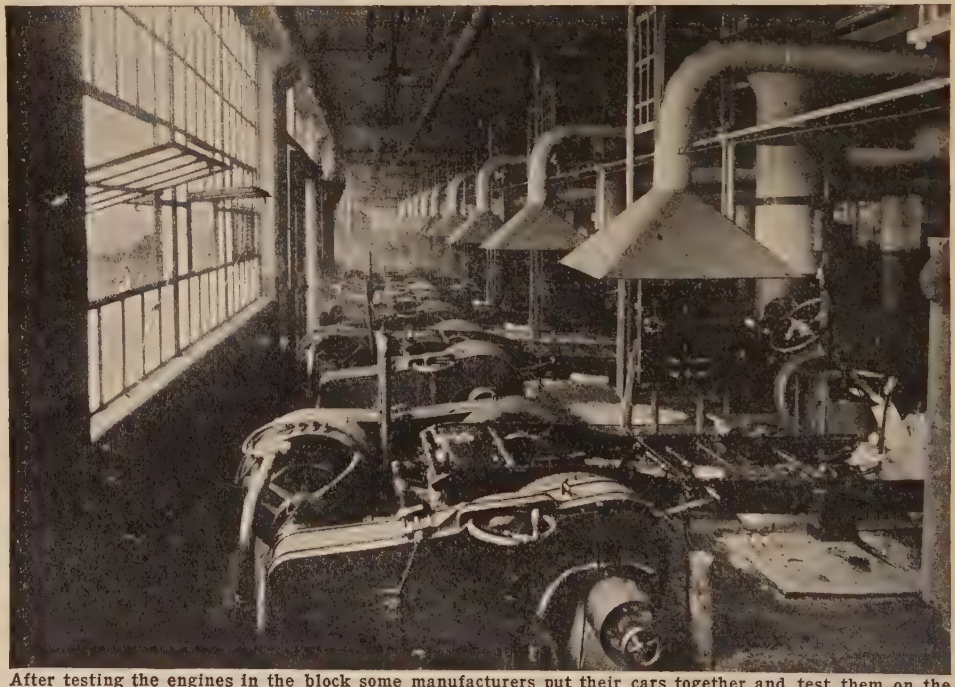
To these numbered blocks in a great factory parts of engines are brought, and skilled machinists put them together. Each engine is made up of hundreds of parts, and all must fit. As you see, the heavy engine can be tilted so that the machinist can work at it from any angle.

When the engine is completed it must run. So it goes to the testing room, where it is placed on a solid foundation and is run for hours. If any of the parts are defective, or do not fit, the fact will soon be apparent to the watchful eyes of the testers.

THE CHASSIS IS NOW COMPLETE



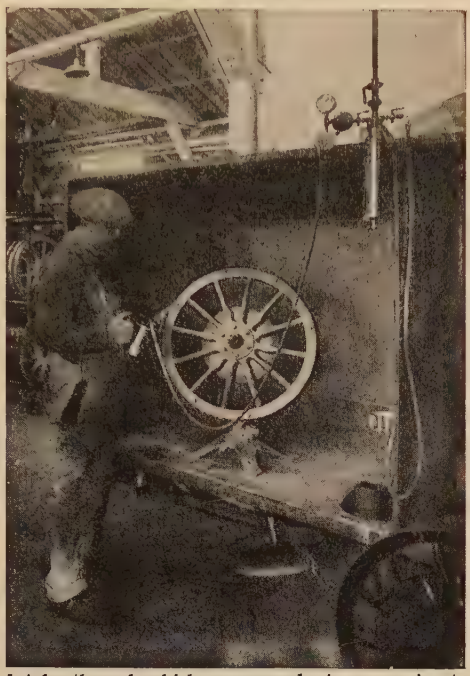
The completed engine is being swung down upon the frame, which has been picking up parts as it moved along. The engine will be fastened securely, and then the frame will go on to have other parts attached. It may soon be called a chassis, which is the French word for "foundation." It means the whole of the running parts taken together, while the remainder is called the body.



After testing the engines in the block some manufacturers put their cars together and test them on the road. Others give the completed chassis a test before attaching the body. Here the chassis is being given a test of two hours, equivalent to fifty miles of travel.

MAKING BODIES FOR THE CARS

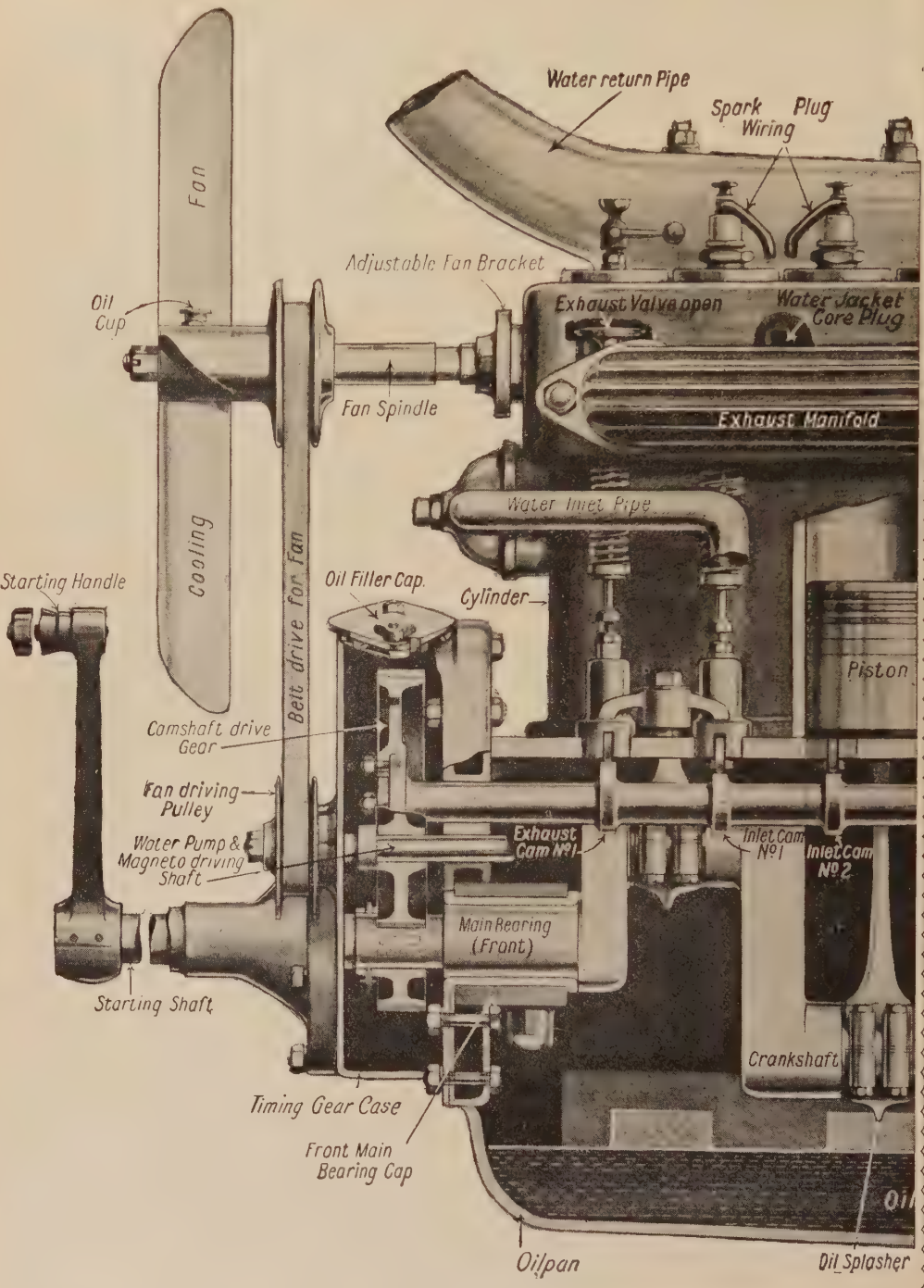
This automatic hammer is shaping a sheet of metal into a sweeping curve for the body. The stamping machines cannot quite do this, but the hammer does it rapidly as it rises and falls.



A tube through which compressed air passes is attached to the can of paint the workman holds. The paint is sprayed over the wheel evenly and more quickly than it could be done by a brush.

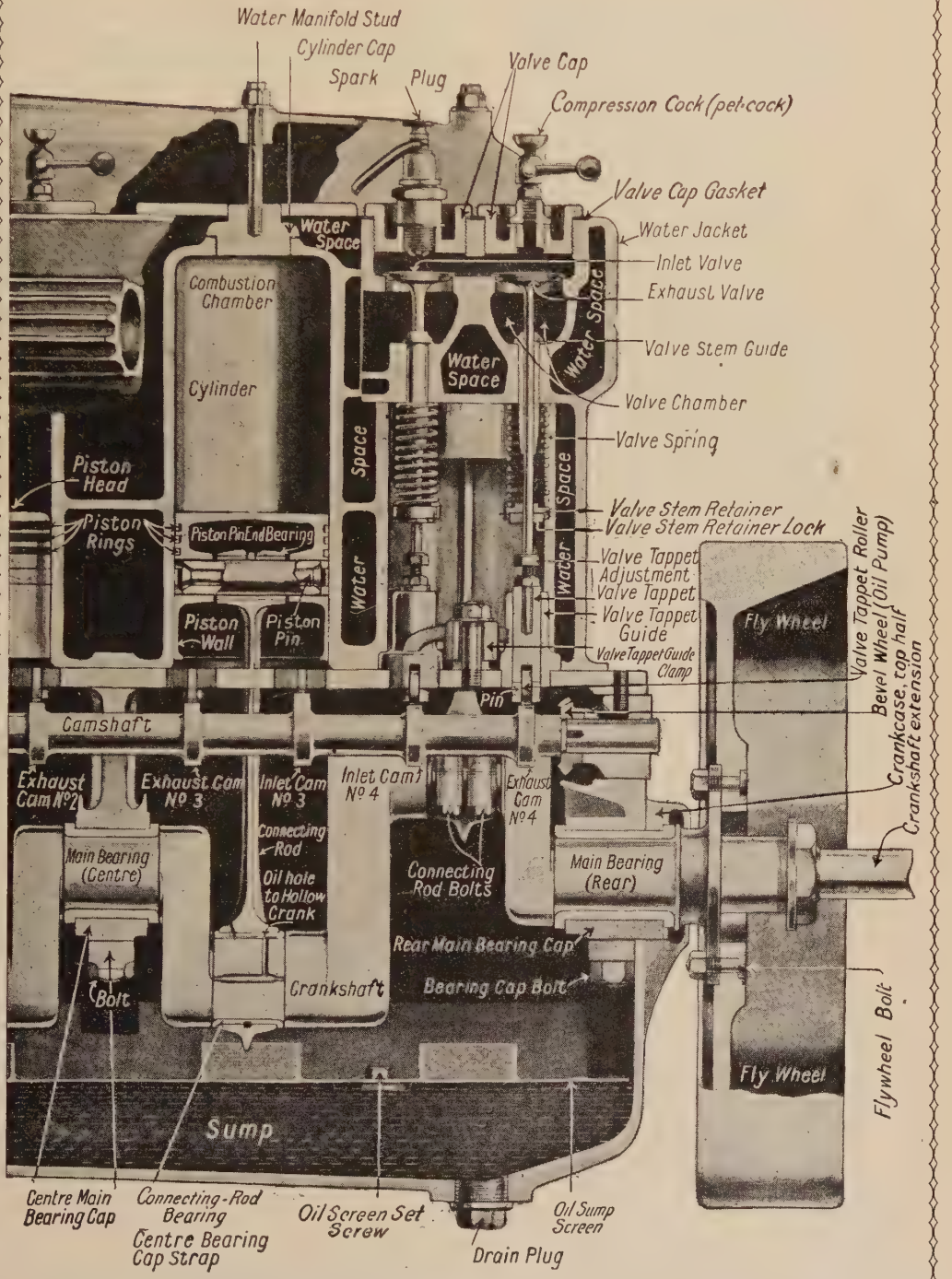
Many closed cars have a wooden framework covered with thin metal. Here are many bodies covered with aluminum or steel. Aluminum, as you know, is the lightest metal in common use, but is very strong. These bodies will receive several coats of paint and varnish before they are completed. The touring car has a top of leather or fabric which can be folded together or else removed altogether.

THE WONDERFUL LITTLE ENGINE THAT



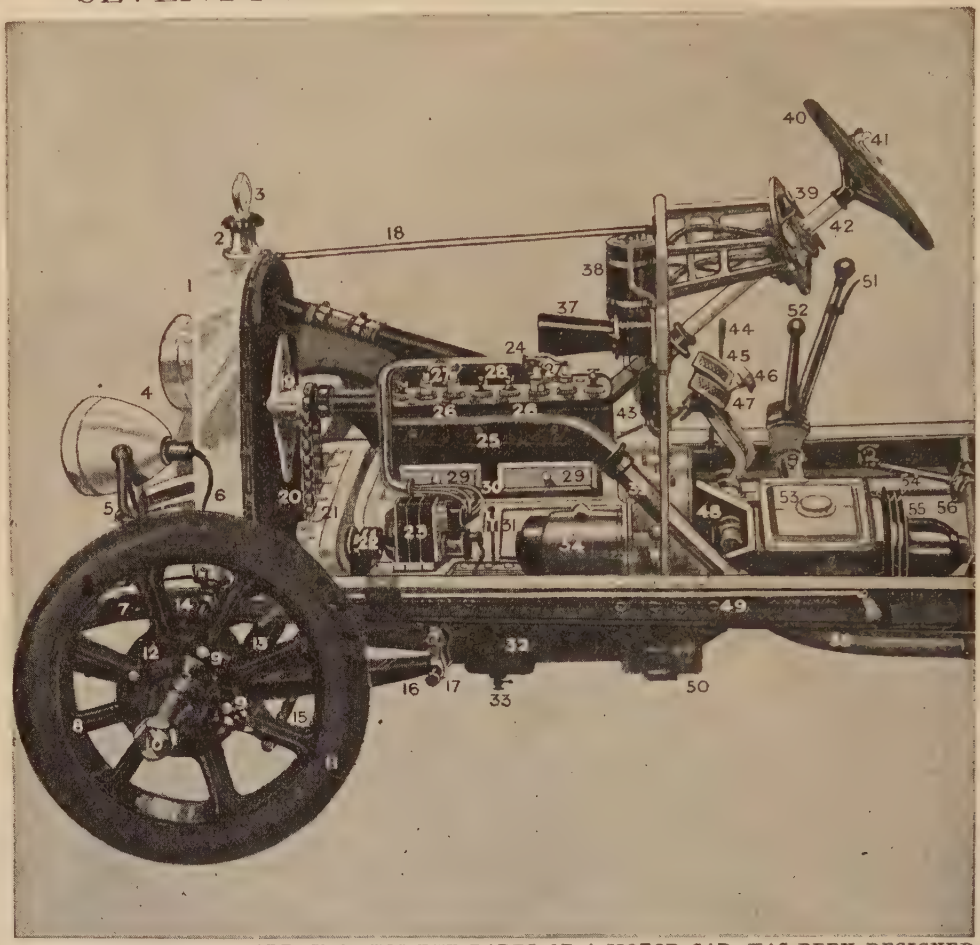
A SECTION OF A FOUR-CYLINDER ENGINE OF A MOTOR CAR, WITH MOST OF ITS PARTS

HAS CHANGED THE FACE OF THE WORLD



NAMED. THE CARBURETOR, MAGNETO AND RADIATOR ARE OMITTED FOR SIMPLICITY

SEVENTY-EIGHT PARTS OF THE CHASSIS

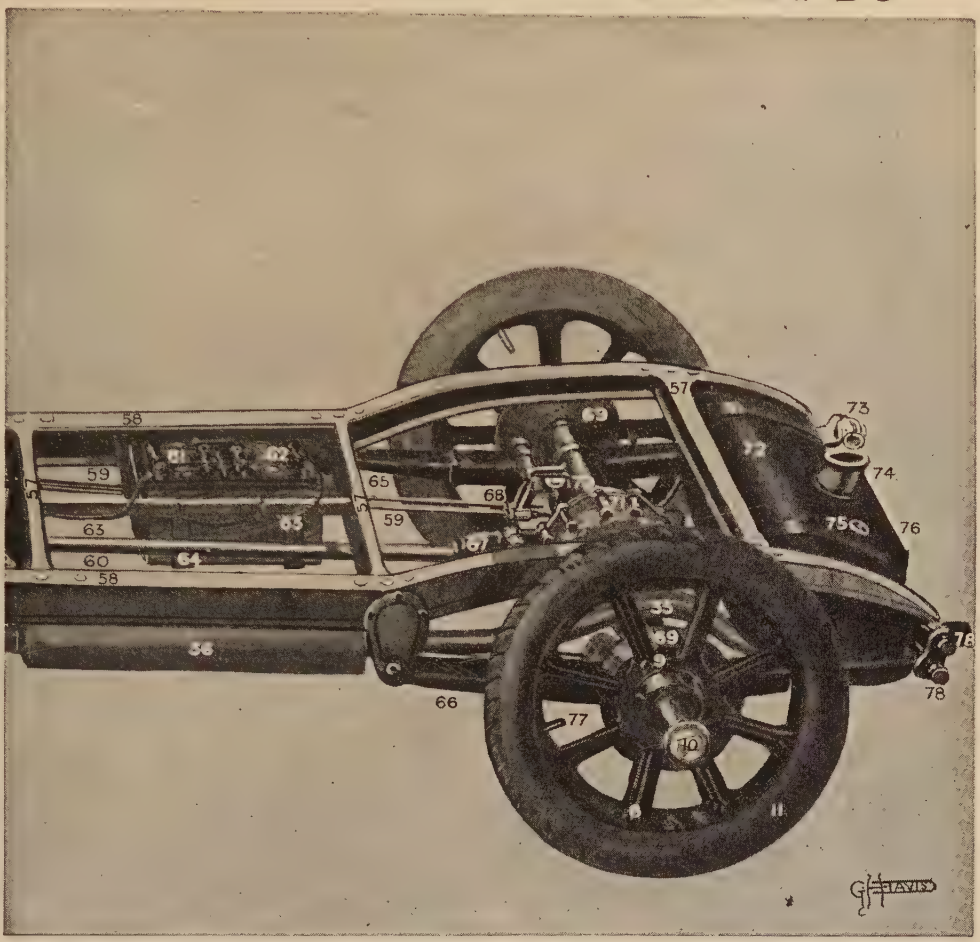


THIS INTERESTING CHART, SHOWING THE PARTS OF A MOTOR CAR, HAS BEEN DESIGNED

1. Radiator.
2. Radiator-filler cap.
3. Radiator thermometer.
4. Dipping electric headlights.
5. Lamp brackets.
6. Electric cable to lamp.
7. Dumb iron.
8. Steel detachable wheels.
9. Bolts holding wheels.
10. Hub caps.
11. Cord tires.
12. Front-wheel brake drum.
13. Front axle.
14. Front-wheel brake control mounted on universal joint.
15. Steering knuckle tie-rod.
16. Front spring inclosed in gaiter.
17. Spring shackle.
18. Stay rod.
19. Fan.
20. Fan belt.
21. Timing-gear case containing drive for magneto, generator and water-pump.
22. Magneto coupling.
23. Magneto.
24. Tube containing electric cables.
25. Four-cylinder engine.
26. Detachable cylinder head.
27. Spark plugs.
28. Compression cocks fixed on valve caps.
29. Valve covers.
30. Wiring to spark plugs.
31. Oil gauge.
32. Oil pan.
33. Oil pan drain cock.
34. Starter.
35. Exhaust pipe.
36. Silencer (muffler).
37. Electric horn.
38. Vacuum tank.
39. Instrument board.
40. Steering wheel.
41. Spark and throttle hand levers.
42. Steering column.
43. Electric junction box where wires meet.
44. Lever for controlling dipping headlights.
45. Adjustable pedal operating brakes on all wheels.

There are other parts of the motor car not shown here. Hidden by the engine are the oil filler, the generator, the carburetor and the water-pump for circulating the water. On the

OF A MOTOR CAR AND WHAT THEY DO



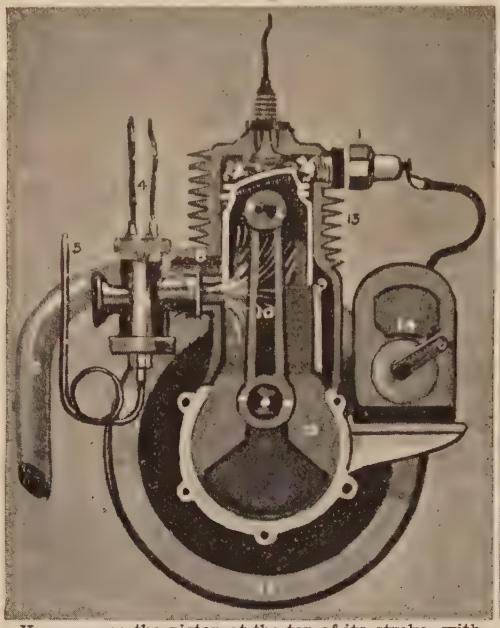
FOR THE BOOK OF KNOWLEDGE BY ONE OF OUR TECHNICAL ARTISTS, MR. G. H. DAVIS

46. Accelerator pedal.
47. Adjustable clutch pedal.
48. Universal joint coupling engine shaft to transmission.
49. Pull-rod for front-wheel left side brake.
50. Case containing flywheel and clutch.
51. Hand brake operating brakes on rear wheels only.
52. Gearshift lever (also frequently placed in centre of frame).
53. Three speed forward and reverse transmission.
54. Push-rod to front brakes.
55. Cover over universal joint between transmission and propeller shaft.
56. Brake equalizer.
57. Frame cross members.
58. Frame side members.
59. Rods to rear-wheel brakes.
60. Propeller shaft.
61. Starting and lighting storage battery.
62. Storage-battery vent plugs for keeping batteries charged with acid and distilled water.
63. Main electric cables.
64. Cradle for storage battery.
65. Rear spring.
66. Rear-spring gaiter.
67. Cover over universal joint coupling propeller shaft and differential.
68. Brake arm.
69. Rear-wheel brake.
70. Rear-axle housing.
71. Casing containing spiral bevel final drive and differential.
72. Gasoline tank.
73. Rear lamp (may be in centre or on left).
74. Filler cap.
75. Level fuel gauge.
76. Rear license plate.
77. Cover over tire valve.
78. Grease caps on rear spring.

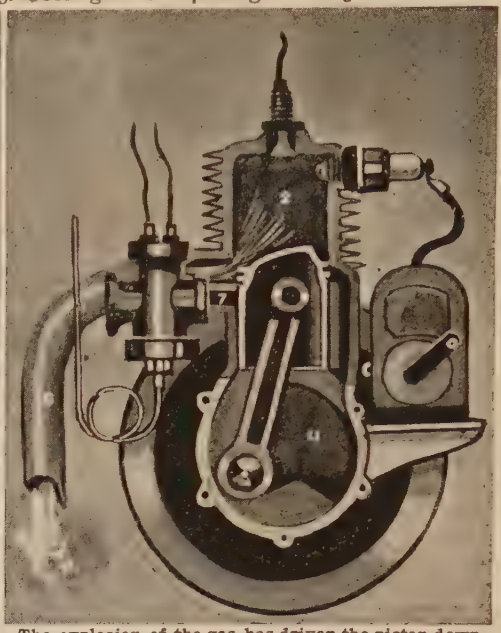
instrument board (Number 39), are: switches for lights, magneto and electric starter, radiator thermometer, clock, electric dashboard light, speedometer, oil pressure gauge, electric meter to show charging of storage battery and carburetor-flooder, or "choke."

TWO-STROKE STATIONARY OR MARINE ENGINE

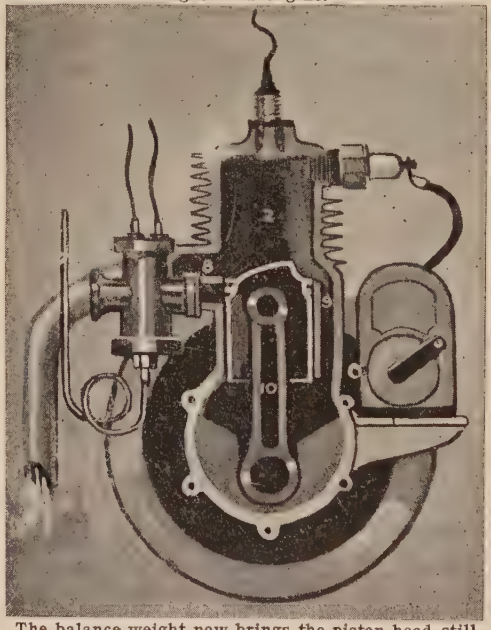
The numbered parts of the engine are: 1. Spark plug. 2. Cylinder. 3. Carburetor. 4. Carburetor control. 5. Gas line. 6. Exhaust pipe. 7. Inlet port. 8. Exhaust port. 9. Transfer port. 10. Piston. 11. Balance weight. 12. Flywheel. 13. Cooling fins. 14. Magneto. 15. Crank-case.



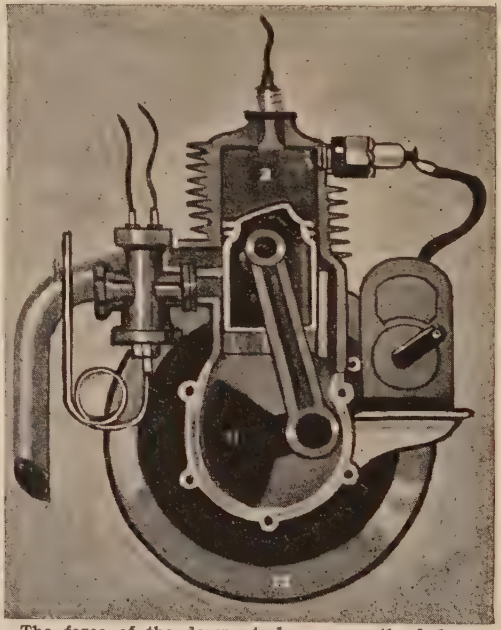
Here we see the piston at the top of its stroke, with the gas above it highly compressed and ready for the spark which will ignite it. When the piston head is in this position, gas from the carburetor enters the lower part of the cylinder and the crank-case. This is a right-hand engine.



The explosion of the gas has driven the piston down, closing the inlet port from the carburetor and opening the exhaust port to enable the burned gas to pass out. The transfer port on the right is closed by the piston head here and in the picture to the left.



The balance weight now brings the piston head still lower, opening the transfer port, and so allowing the gas (which is partially compressed) in the crank-case to enter the upper part of the cylinder.



The force of the down stroke causes the balance weight and flywheel to continue turning and so pushes up the piston once more. The gas above the piston is compressed for the next stroke.

Photo, courtesy Cadillac Motor Car Co.

A modern motor car with wire wheels.

WHAT MAKES A MOTOR CAR GO?

CONTINUED FROM 6694

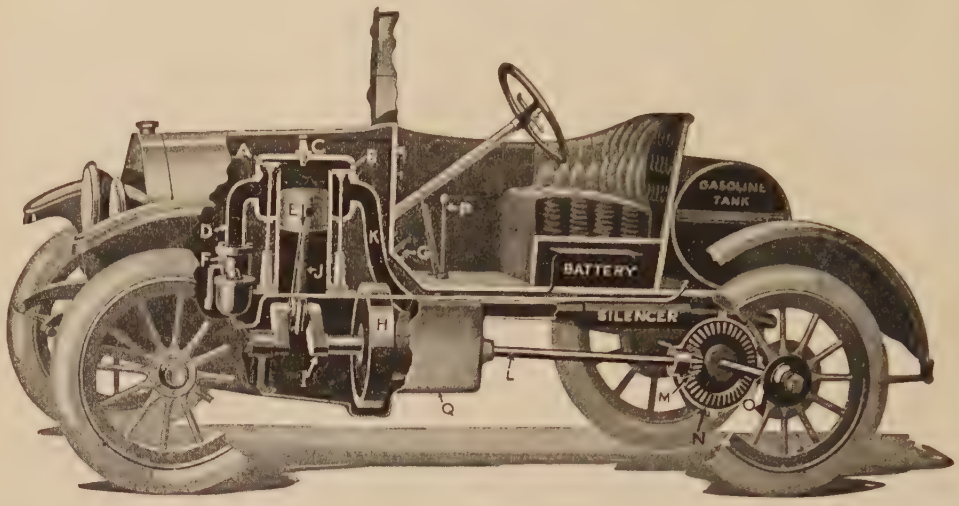
YOU may say that it is the engine and think that you have given a sensible answer. It is correct, of course, but unless you know more than this you cannot be said to know the reason. To be sure, you have much company, for thousands who ride in motor cars every day know little more than that a car has an engine and uses gasoline in some way or other.

As a matter of fact, not all cars do use gasoline, though nearly all of them do. There are a few steam motor cars on the road, and a few electric cars also. The principle of the steam-driven car is exactly the same as that of the locomotive. In fact, it is a locomotive which does not run on rails. On pages 406 and 407 are some diagrams which show how water heated in a boiler is turned into steam and then admitted to the cylinders. There it expands and pushes out the pistons and makes the wheels turn. So we need go no further with this. The principle of the electric car is different. It runs upon the energy stored up in the battery, and when that energy is exhausted it cannot go on until the battery is recharged.

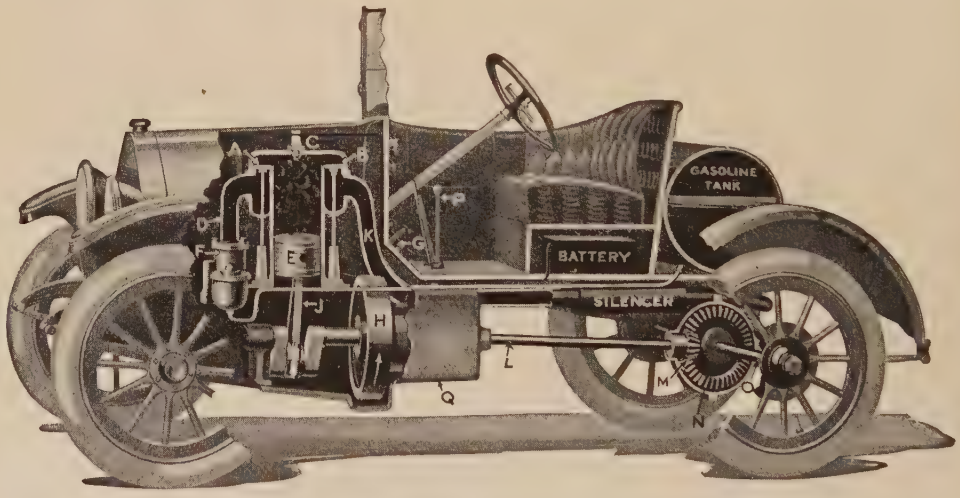
But what about the gasoline car? In the first place, the engine is entirely different from the steam engine, though it has cylinders and pistons. It is what is called an internal-combustion engine. In the steam car, as we have said, the water is turned into water-vapor, which is a gas, in the boiler and is then admitted to the cylinders. In an internal-combustion engine gasoline vapor and air are admitted into the cylinders from the carburetor, and are then set on fire by an electric spark. The gas produced by the explosion expands enormously and drives out the pistons with great force. These pistons are connected with the crankshaft, and they make it turn. The diagrams we show and the long explanations with the four pictures which go with this question will show you very clearly how the engine works. The fact that a real engine like those shown in the story of how motor cars are made has four, six and eight cylinders, makes no real difference in the principle. The larger number of cylinders makes the engine more powerful and causes it to run more smoothly, but the one cylinder of our diagrams shows the principle, and that is what you are after.

The next important thing is the carburetor. This little device furnishes the gasoline in such shape that it can be exploded in the cylinders. If you

WHAT MAKES A MOTOR CAR GO



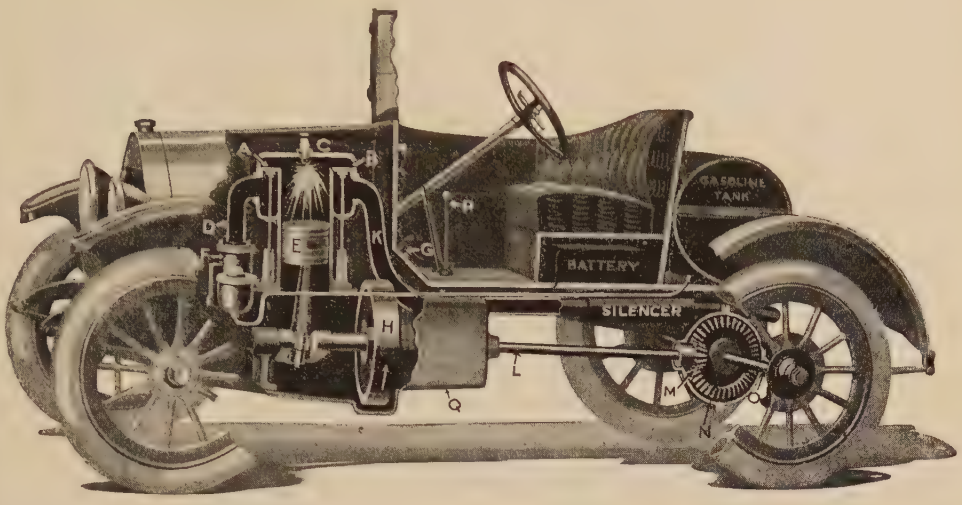
The works of a motor car seem hopelessly puzzling, but the machinery which makes it go is really very simple. Here is a car with part of the side broken away. A regular motor car has four, six, eight, or even more cylinders in its engine, but we show only one for the sake of clearness. A motor boat or a motor cycle works in much the same way. The inlet valve A is open ready for the gas to rush in; B is the exhaust valve through which the used-up gas is forced out; C is the spark plug with a wire running from the ignition coil to the batteries under the seat; D is the inlet pipe through which a mixture of air and gasoline vapor passes; E is the piston, which slides up and down in the cylinder and is connected by the connecting-rod J to the crankshaft I. The cylinder is shown here much enlarged, and the cooling arrangement is omitted.



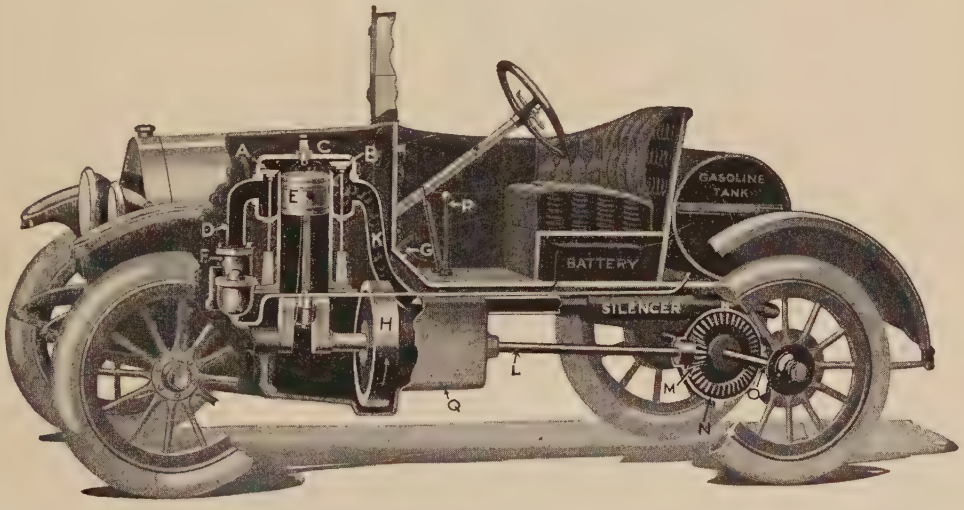
Now let us see what happens when the crank in front of a car is turned or the button G of the electric starter is pushed. Either of these things makes the flywheel H turn, which pulls the piston E to the bottom of the cylinder, creating a vacuum. Gasoline from the tank back of the seat, in passing through the carburetor F, is broken up into a fine spray and mixed with air. This mixture, which is a very explosive gas, rushes through the pipe D and the valve A and fills the cylinder. When the piston E reaches the bottom both inlet and exhaust valves are closed, and the flywheel, as it continues to rotate, pushes up the piston and compresses the gas which has been drawn into the cylinder into a much smaller space.

The diagrams on this page and the following, copyright, 1918, by The Grolier Society.

WHAT MAKES A MOTOR CAR GO

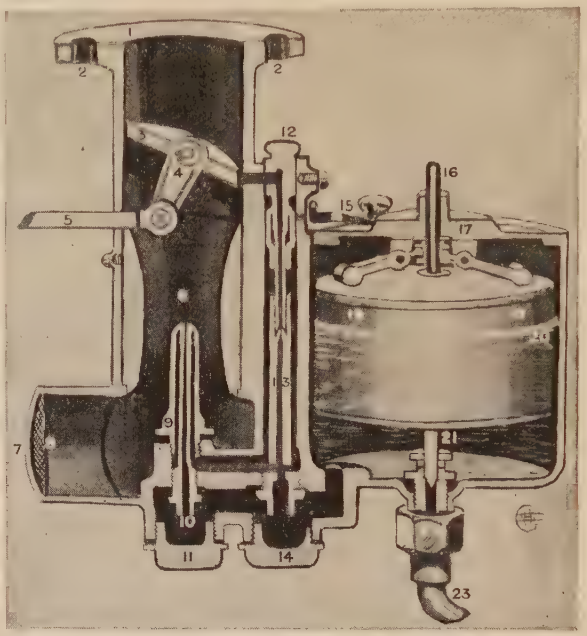


When the piston E has reached the top and the gas has been compressed into a very small space, the spark plug C at the top of the cylinder is arranged to give off a spark. The compressed mixture of gasoline vapor and air instantly explodes and drives down the piston with tremendous force. This explosion furnishes the energy to move the car. The same thing is going on in the other three, five, or more cylinders of the car, but the explosions are arranged to take place at different times, so that the flywheel turns smoothly and continuously. The connecting-rod which is joined to the crankshaft makes the flywheel spin around swiftly, and as it turns it pushes the piston up again. Without the flywheel the piston might stop at the bottom of the cylinder after the first explosion, and the engine would stop.



As the piston starts upward again after the explosion the exhaust valve opens and the used-up gas is forced out through the exhaust pipe K. The silencer, or muffler, destroys much of the noise of the explosion. This used-up gas causes the odor you get after a car has passed. The flywheel continues to turn, and the piston starts down again and draws more gas into the cylinder, ready for another explosion. The flywheel and the crankshaft can run without moving the car, or can be connected with the shaft L in the transmission Q. The shaft L, by means of cogwheels M and N, turns the rear axle O and makes the car move. Whether the car stands still while the engine runs, goes backward or moves forward at low, intermediate or high speed is governed by the lever P, which you see in the body of the car.

will study the diagram of a carburetor in this story and the diagrams on the other pages you will be able to understand how it works. There are many different types of carburetors, but all do the same thing; that is, they break up the gasoline into a fine spray and mix it with air. When the piston is drawn down, a partial vacuum is created in the cylinder and in the pipe which leads into it. Air rushes in from outside to fill the vacuum. As the air passes through the carburetor, gasoline is drawn through a tiny jet, at once breaks up into vapor, and is drawn into the cylinder with the air. The carburetor is adjusted to furnish only a certain amount of gasoline. Usually the average of the mixture is about one part of gasoline and fifteen parts of air. If there is more gasoline, we speak of the mixture as "rich." If there is less, it is "lean." Of course, it is economical to use as little gasoline as possible and still keep the engine moving with smoothness and with sufficient power.



THE CARBURETOR, IN WHICH THE GASOLINE IS VAPORIZED AND MIXED WITH AIR

1. Flange. 2. Bolt hole. 3. Butterfly throttle. 4. Throttle spindle. 5. Throttle lever. 6. Choke tube. 7. Air inlet. 8. Gauze. 9. Main-jet cover. 10. Main jet. 11. Plug under main jet. 12. Knob of idling device. 13. Adjustment piece of idling device. 14. Plug under compensating jet. 15. Spring holding down cover of float chamber. 16. Tickler. 17. Float-chamber cover. 18. Counterweights. 19. Float. 20. Gasoline level. 21. Float needle. 22. Gasoline pipe union. 23. Gasoline pipe.

As you can see by the diagrams, after the mixture is drawn into the cylinder the piston comes up again and compresses it. As the piston is near the top of the cylinder an explosion takes place and drives the piston violently toward the bottom of the cylinder. How does this happen?

By the side of the engine is a tiny dynamo, similar to the great dynamos which drive heavy machinery or furnish the lights of a city. This generates electricity which is stored in the batteries. From this reservoir current is drawn for starting the motor, for lights, and even if the generator stops working, the battery can furnish enough current to keep the car going for a considerable distance. For exploding the charge, the current passes through the ignition coil and then by wires it goes to every spark plug. In the lower end of the spark plug, projecting into the cylinder, there is a gap in the wire about the thickness of a dime. As the current jumps this gap a spark is produced which sets the explosive mixture on fire. The resulting explosion drives down the piston. The current to the spark plug is not continuous, but is arranged to jump the gap only when the mixture has been compressed by the rising piston.

Though a modern motor car is very complex, and hundreds of parts are required to enable it to do the things we have mentioned, these are really the essential things. That is, a mixture of gasoline vapor and air is drawn into the cylinders through the carburetor, and is there compressed. Near the point of greatest compression an electric spark which has been generated by a small dynamo explodes the mixture. A study of the diagrams along with these explanations will enable you to understand the principles.

These are not all the important parts of a motor car, of course, but the gasoline system and the electrical system are vital, because they furnish the power. If either of these is out of order the car will not run, and is therefore useless.

THE NEXT WONDER QUESTIONS ARE ON PAGE 7245.

Buenos Aires and the Rio de la Plata early in the nineteenth century.

THE REPUBLICS OF SOUTH AMERICA

PART II

CONTINUED FROM 6983

IN the first part of our story of the South American republics we told you about the countries in the northwest and west, and the two little countries of Uruguay and Paraguay, and the struggles they have had to gain freedom and settled government. In this part we shall tell you the story of the A, B, C countries, as they are called, the three more powerful republics of Argentina, Brazil and Chile.

The old name for Argentina was the Viceroyalty of La Plata, and the viceroy had his seat of government at the city of Buenos Aires, the beautiful city which is now the capital of the republic. Trouble for the Spanish government began in Buenos Aires some time before the revolution, for when Spain was in alliance with Napoleon, a British expedition invaded the province. The viceroy ran away, but the Argentines, under a Frenchman named Liniers, defeated the British, who had a very poor general, and captured a large force. A number of the British officers settled in the Argentine, and it is said that their influence helped on the revolution.

The revolution began in Buenos Aires on May 25, 1810, when a *junta*, or committee, was appointed to take over the government from the viceroy, who, compelled to resign, was sent out of the country. But though the viceroy went quietly, the revolution was not peaceful. Not only were there Spanish garrisons in the towns, but the people were divided. Many who called themselves Royalists wanted the old conditions to continue, and war began. At the beginning of the war the Patriots, as the revolutionists called themselves, had many ups and downs. But in 1812 the Patriot army, under General Manuel Belgrano, defeated the Royalists in the battles of Tucumán and Salta, and these two victories decided the independence of Argentina. The next year Colonel José de San Martin, an officer who had gained experience in the Peninsular War, gained command of the armies, and was able to keep the war with the Spanish in Chile and Peru. There was much fighting in Argentina afterward, but it was among the Patriots themselves, and was caused by the mistakes made in learning how to govern themselves.

The Spanish Viceroyalty of La Plata had been made up of a number of

smaller provinces, and now an effort was made to unite all these provinces into a confederation. There was jealousy between the provinces, however, and Bolivia, Paraguay and Uruguay declined to join, and set up governments of their own. The other provinces formed the Confederation of Argentina, and in 1825 they adopted a constitution, but it was long before there was any real unity in the country.

WHY THERE WERE MANY QUARRELS AMONG THE REVOLUTIONISTS

When we compare the Revolution in North America with the revolutions in South America, we must remember one great difference between them. In North America the Revolution was the result of the opinions of a large number of people expressed by their chosen representatives. In South America the leaders chose themselves and proceeded to make the revolutions. Naturally, in such a case there would be much jealousy between the leaders, and even before the war of independence was won they began to quarrel.

For a while the quarrels among the Patriots in Argentina caused something like anarchy, and at one time some of the leaders thought even of turning the government into a monarchy. In 1826 Rivadavia, a statesman who had done much for the good of his country, was elected president. He tried to establish a strong government, and although his power lasted only a year, he succeeded in that short time in improving the laws. He was anxious that education should be improved, and it was he who established the University of Buenos Aires.

Not only was there jealousy among the leaders, but the provinces in the Confederation soon showed jealousy of one another. Some of them sought to make themselves independent, and for some years there was civil war, anarchy and tyranny. So that you may understand the cause of the trouble we must tell you that there are two kinds of republic. One is like the United States, which comprises a number of states united under one government, but in which each state has certain powers of self-government. The other kind of republic is like that of France, which has only a central government, and the provinces have no power to make laws. Some of the people of Argentina wanted the first kind of government, and were called Federalists. Others wanted a government like that of France, and were called Unionists. In the midst of the confusion there was a war with Brazil for the possession of Uruguay, which lasted for years and added greatly to the trouble of the distracted country.

THE STORY OF A TYRANT GOVERNOR

All this trouble and confusion gave Juan Manuel de Rosas, the leader of the Federalist party, an opportunity of seizing the government, which he controlled for more than twenty years. During the greater part of this time he was a dictator, or, rather, a tyrant; and until he was overthrown his will alone was law. Rosas reminds us of the queen in Alice in Wonderland, who, when anyone displeased her, said, "Off with his head." Anyone who ventured to oppose this grim tyrant, or was even suspected of disagreeing with him, was likely to be put to death, and it is said that many thousands lost their lives that Rosas might stay in power.

In 1852 Rosas was driven from the country, and immediately afterward a new constitution was adopted by all the provinces except Buenos Aires, which refused to accept it and was allowed to stay outside the Confederation in lonely grandeur. Ultimately there was a civil war, which ended by Bartolomé Mitre, the president of Buenos Aires, becoming president of the Confederation, and the city of Buenos Aires being again made the capital. During President Mitre's administration war was made against Argentina by Paraguay, as we have already told you on page 6982, and, as you know, Paraguay was defeated in the war, which lasted for five years.

Since its close, except for a few small insurrections, Argentina has been at peace. There have been boundary disputes with the surrounding countries, but these disputes have been wisely settled by arbitration. During the years of peace the country has prospered exceedingly, and has gained the reputation of being a well-governed nation with a self-controlled people.

THE COUNTRY OF ARGENTINA AND ITS PEOPLE

Argentina has great natural wealth in its fertile plains, or pampas, which provide grazing-ground for immense herds of cattle and horses and flocks of sheep. Large tracts of land are devoted to the

ON A RANCH IN ARGENTINA

TRANSPORTING WOOL

FINE BERKSHIRE PIGS

LINCOLN SHEEP

RANGE CATTLE

cultivation of wheat and other crops. The northern part of Argentina is tropical, while the south stretches far down into the temperate regions, so that almost every kind of crop can be grown within the limits of the country.

There are not many Indians in Argentina, and most of them live in the hot northern territory. Rosas made war against the wild Indians of the southern plains and reduced them to helplessness, and the tall Patagonians have almost died out. The picturesque *vaqueros,* or cowboys, of Argentina are not really Indians. They are *gauchos,* a people who are of half Indian and half Spanish descent. The white people who were in Argentina at the time of the revolution were nearly all Spanish, with very little Indian mixture. Since then people from every country in Europe have gone to live there. Unfortunately these people live in numerous little colonies of their own, instead of mixing with one another to make one people, and it will be long before Argentina really becomes a nation.

The Revolution in Chile Helped by Argentina

A few months after the revolution began in Argentina, Chile followed the example of the Argentines. The Spanish governor was forced to resign, and a Chilean *junta* undertook the government. Naturally, just as they did in the other provinces, the Spaniards tried to retain their power by force, and for a time it seemed as if they might succeed. From the beginning the revolutionary leaders were jealous of one another, and because of their desperate quarrels it was impossible to make headway against the Spanish army. The Patriots, however, struggled on until 1814, but in that year they were badly defeated; the Spanish were enabled to take control of the government again, and the revolutionary leaders had to leave the country. One of them, Bernardo O'Higgins, fled to Argentina and took refuge in Mendoza, and there met José de San Martin, who had been made governor of the province.

Argentina, as we have seen, was already distracted by disputes. But San Martin, who sought nothing for himself, had not been drawn into the disputes, and therefore he was free to go to the aid of Chile, a task he was all the more willing to undertake because he knew that, with Peru and Chile in her power, Spain would soon be in a position to attack his own country. Before long he got together a well-trained army of Argentines, chiefly *gauchos,* and taking O'Higgins as his second in command, he made a great march through the Andes and defeated the Spaniards in a pitched battle not far from Santiago. The next year the Spaniards made another effort to subdue the Chileans, but were defeated in two battles, and from that time on there was no doubt of Chilean independence. Then the Chileans set to work to build a fleet, which, as we have told you, took San Martin north to Peru to free that country.

The Early Troubles of the Republic of Chile

Meantime Bernardo O'Higgins was made director-general, or, rather, dictator, of the republic, and in spite of many dissensions he was able to organize the government and to keep peace for five years. At the end of that time he saw that the people had turned against him, and to save the country from revolution he resigned. A constitution was then adopted, but the new government did not last long. In fact, in the next seven years there were no less than ten changes of government, and three different constitutions were drawn up and adopted. There was an Indian war and there was civil war, there were quarrels between the Church and the State, and there was trouble caused by lack of money, and the republic seemed to be drifting toward anarchy.

At last, however, a strong conservative government took the reins of power. One conservative president after another ruled with a high hand, and all power fell into the hands of a few great landowners, while the great masses of the people were denied any share in the government. But for thirty years there was peace, and during this time the country made long strides in progress. Railway and telegraph lines were built, banks were established, and schools and libraries were founded. During this peaceful period at home Chile went to the help of Peru in the little war with Spain, of which we told you on page 6980. There were boundary disputes with Argentina which were peacefully settled for the time, and there was a boundary dispute with Bolivia, which in 1879 led to a war that was disastrous for both Bolivia and Peru.

SCENES IN THE ARGENTINE

Photo, Olds.

THE CATHEDRAL, BUENOS AIRES, DATING FROM 1752

Photo, Olds.

NATIONAL MUSEUM, VICEROYALTY OF LA PLATA

Photos, Subirana.

BEACH AT MAR DEL PLATA, THE NEWPORT OF THE ARGENTINE

THE WAR BETWEEN CHILE AND PERU

In this war, as we read on page 6978, Peru went to the help of Bolivia, and declared war on Chile. But the Chileans outgeneraled the Peruvians and Bolivians in every move. The Peruvians won one naval battle in the first year of the war, but they were hopelessly overmatched both on land and sea, and Chile won the war. Peru and Bolivia were badly defeated, and when peace was made the provinces of Tacna and Arica remained in the possession of Chile, but the treaty provided that a plebiscite should be held after ten years. This plebiscite was put off, and the matter was submitted to the arbitration of President Coolidge in the spring of 1925. The boundaries were decided, and a plebiscite—the first in the New World—held in the summer to determine whether the provinces should remain Chilean or revert to Peru. Chile also remained in occupation of the Peruvian province of Tarapacá and the Bolivian province of Antofagasta. Antofagasta was ceded to Chile by treaty in 1905, and except for right of way through Chilean territory, Bolivia is shut out completely from the sea. Peru still claims that Tarapacá belongs to her, but Chile has kept possession of the province.

In 1887 the peace that Chile had enjoyed at home was broken. In that year the president, Señor José Manuel Balmaceda, who had roused opposition against himself, tried to carry on the government without calling a session of the legislature. This high-handed proceeding was followed by civil war. The president's followers were badly defeated, the war coming to a sudden end when the president shot himself to escape capture.

Once the civil war was ended, the republic went back to its peaceful course. Disputes about the southern Argentine boundary threatened to break the peace; but, as we have seen in the story of Argentina, the disputes were happily settled by arbitration and Chile given a strip along the southern coast of the continent so that she should hold both coasts of the Straits of Magellan. Where other conflicts have occurred they were of a social nature, and were due to an increasingly important middle class taking issue with the landed aristocracy. The latter call themselves the National Union party, the former the Liberal Alliance.

Chile has gone on to prosperity at a steady pace, which has been broken only once, and then not by war. In 1906 a terrible earthquake, followed by a fire, destroyed the city of Valparaiso and wrecked parts of Santiago and other towns. During the World War Chile remained neutral. Her nitrate export was at first seriously interfered with, but its value afterward much increased by its use in explosives.

CHILE IS A VERY LONG NARROW COUNTRY

Chile is so long and narrow that it has been compared to an eel. Its breadth nowhere exceeds 250 miles, and in places it narrows down to less than 90, while its length exceeds 2,600 miles. The northern part of this long narrow country is within the tropics; the southern part is within the same latitude south as Labrador is north. You can see, therefore, that the climate is very varied. In the desert of the dry belt the heat is tropical, while the southern climate is like that of the north of Scotland. Chile, as you may see from the map, is a mountainous country, and the Andes run through its entire length. But in central Chile the mountains divide into two ranges, and in between these ranges lies the great central valley, 600 miles long, and farther north there are smaller valleys. It is in these valleys that the agricultural wealth is produced. They are all very fertile, and are watered by mountain streams and rivers, which leave a rich deposit of mud, brought down from the hills. The central valley is in the temperate zone, and, by reason of both its size and its climate, produces the chief agricultural wealth of Chile. More than the amount of food required from the country can be raised on the valley farms, and Chile has large quantities of grain and wine for export. The chief wealth of the country lies, however, in the nitrate deposits found in the provinces of Antofagasta and Tarapacá which were taken from Bolivia and Peru. The nitrate is used to fertilize land, and 2,500,000 tons of it are exported every year to North America and to Europe. Chile also has great mineral wealth in her copper and iron mines. Coal is sent to Peru, and silver, lead, tin and other mines are worked. There are large forests in the southern country, and some of the wood is valuable.

The Spanish conquerors frequently in-

MAKING HISTORY IN CHILE

This beautiful picture shows the ships in Chile's first navy, commanded by Lord Cochrane, a brilliant Irish sailor. These ships took the Chilean ports of Valdivia and Valparaiso from the Spaniards, and carried San Martin and his army to the aid of Peru. As you have read, the army was successful.

When Bernardo O'Higgins, the first president of Chile, found that if he stayed in power there would probably be a civil war, he resigned his office and quietly went away to Peru, where he lived till his death. Chile has had fewer revolutions than any other Spanish South American republic.

termarried with the Indians. This was especially the case in Chile, where, within the limits of the Spanish colony, the Araucanian people became fused with the Spanish people into a new race, which forms a large part of the population. About a quarter of the people of Chile are of pure Spanish descent, and there are, it is said, about a hundred thousand Indians. Emigrants have begun to go from Europe to the south of Chile, and many Peruvians and Bolivians work in the nitrate mines in the north.

In spite of the prosperity of the country, most of the people are ignorant and poor. Education is free, but it is not compulsory, and more than half the people in the country have never been to school. Military service is compulsory, however, and the boys who have been drafted are compelled to go to school and at least learn to read and write.

THE DISCOVERY OF BRAZIL BY CABRAL

Perhaps you have wondered how it was that although the king of Spain claimed all the Western World, he allowed the Portuguese to make peaceable settlements in Brazil. This is a question that brings up a story so interesting that we shall tell it to you here before we go on to the real story of Brazil.

About the time that Columbus discovered America the Portuguese were the great explorers of the world, and had already worked their way far down the coast of Africa in an endeavor to find their way to India by sea. When Spain took up the work of exploration, and Columbus discovered what seemed to be a new way to India from the west, the pope feared that these two nations might quarrel over their discoveries and go to war. To avoid such a catastrophe he drew a line on the map, about a hundred miles west of the Cape Verde Islands, and said that the Spanish must not attempt to explore to the east of this line, nor the Portuguese to the west of it. Portugal was not satisfied with this rule, however, and so a treaty was made between the two countries which provided that the line should be drawn about eight hundred miles farther to the west. This imaginary line, which is famous in history as the Papal Line of Demarcation, ran about fifty degrees west of Greenwich.

At the time the treaty was made no one knew that the continent of South America existed. It was discovered shortly afterward, and the Spanish people claim that Brazil was discovered by a captain named Vicente Pinzón in 1500. The Portuguese, however, claim that the Brazilian coast was first seen in the same year by Pedro Alvarez de Cabral, and it is this great man whom the Brazilians honor for the discovery. Cabral, who was on his way to India, found Brazil by sailing too far to the west. He knew that he had made an important discovery, and before he went on to India he sent a ship home to tell the king of Portugal that he had found a rich country inhabited only by naked savages.

The king was quick to take advantage of the new discovery, especially as Vasco da Gama found that the land lay a long way to the southward. Navigators, of course, were able to assure the king that the land lay on their side of the Line of Demarcation, and as they had the right to make settlements, the Portuguese began to send out colonies. The first colony was established in 1503 south of Bahia. A short time later another settlement was made on the Bay of Bahia itself, and these colonies became centres from which other settlements were made.

STORMY DAYS IN THE YOUNG COLONY

The early days of Portuguese occupation of the country were stormy, for the French and Dutch both tried to take part of the coast and build up colonies. The first-comers were the French, who discovered the bay of Rio de Janeiro and made a settlement there. It took some time to get rid of them, but at last they were driven out. The young country might then have been left in peace, but unfortunately King Philip II of Spain became king of Portugal. Both England and Holland were fighting against Philip, and when Portugal became part of his dominions, they began to look on Brazil as another place where they might carry on their war against him. The English made raids on the towns, but the Dutch were more persistent, and made every effort to drive out the Portuguese. A Dutch fleet actually captured Bahia, the capital of the colony, in 1624, and kept possession of it for more than a year before it was retaken. A few years later the Dutch sent out another expedition, this time against the province of Pernambuco. Of this province they made them-

TWO BEAUTIFUL PANORAMAS IN RIO

The bay from Corcovado, with Sugar Loaf Mountain in the distance. The inset shows Sugar Loaf with its aerial railway. The little mountain line which runs up to Corcovado is through superb forest scenery.

Here we have the view looking the other way from Sugar Loaf toward the peaks of Gavea and Corcovado.

selves masters, and not only held it for years, but obtained a heavy ransom for it after they had been defeated by the Brazilians in a sharp war. Meantime the Brazilians had been spreading their settlements southward, and in the eighteenth century they came into touch with the Spanish colonies. You can understand that the southern part of the continent, away from the Equator, is more suitable as a dwelling-place for white people than the north, and realizing this, the Brazilians tried to gain possession of the country as far as the river Uruguay and the Rio de la Plata. The Spaniards resisted, and there was a constant struggle between them for Uruguay. While the Spanish colonies were fighting for independence Brazil succeeded in gaining possession of Uruguay, although that little country made a great fight for freedom under her brave leader Artigas and others. Finally, as we have told you on page 6982, after a war between Argentina and Brazil, Uruguay obtained her independence.

How Brazil became an empire

Before this war events of great importance had happened in Brazil, where the Napoleonic Wars had just as much influence as in the Spanish colonies, but in a quite different way. In 1807, when Napoleon sent an army to conquer Portugal, the country was not prepared, and the French army marched so rapidly on Lisbon that the regent, Prince John, had to escape by sea, taking his mother, Queen Maria, and his wife and family with him. He had nowhere to go in Europe, so he sailed to Brazil, and made the city of Rio de Janeiro the seat of his government. This action made a great deal of difference to the country. From being a colony with all sorts of restrictions in its trade and commerce it at once became the centre of activity. Free trade was allowed with other countries. Prince John declared that Brazil was henceforth a kingdom, and after the death of the invalid queen Maria he was crowned king in Rio de Janeiro.

But when Portugal was freed from the French armies King John VI went back to Europe, leaving his son Pedro as governor. This did not please the Brazilians at all. They refused to become subject to Portugal again, and in 1822 they declared Brazil an empire, with Prince Pedro as the first emperor. There was a little fighting, but on the whole it was a peaceful revolution, and the next year the emperor was crowned as Pedro I. He tried to rule with wisdom, and gave the country a good constitution. But for various reasons his ideas became less liberal, and partly because of this and partly because of the loss of Uruguay, he became very unpopular. Strengthened by his unpopularity, republican ideas began to spread, and to avoid the danger of a revolution, Pedro I abdicated the throne in favor of his little son, a boy five years old, and left the country.

The empire turned itself into a republic

Pedro II was at once proclaimed emperor, and the government was carried on by regents until he was fifteen years old, when, in 1840, he was declared to be of age. In spite of his youth he proved to be a wise and liberal ruler, and during his long reign Brazil grew slowly in importance. He was much beloved, but his only daughter, the Princess Isabel, who was to succeed him, was not liked. The people determined that she should not rule, and in 1889 the empire was overthrown and a republic declared. Slavery in Brazil was abolished in the last year of Pedro's reign.

The new republic went through the usual period of unrest and civil war that a revolution nearly always brings, but it did not last as long in Brazil as in the other South American republics. Troubles with Great Britain and Bolivia about boundary questions were settled by arbitration, and on the whole the course of the republic has been fairly peaceful. Of the South American countries Brazil alone took active part in the World War, sending her warships to join the navies of Great Britain and the United States, after declaring war on October 26, 1917. During her neutrality her commerce was interfered with and her ships sunk by German submarines. After severing relations with Germany Brazil seized the forty-six German ships interned in Brazilian harbors. Brazilian aviators took their place on the Western front, and many Brazilian physicians and Red Cross units co-operated with the Allies. For her enthusiastic support Brazil was given representation in the Council of the League of Nations, where, at its first meeting, in London, February, 1920, she was the only American power represented.

Brazil has manufactories which are

THE DECLARATION OF INDEPENDENCE OF BRAZIL

After King John went back to Portugal the Brazilians determined to be independent, and made Prince Pedro their first emperor. The story says that the king ordered his son to return to Portugal, but he refused. On September 7, 1822, Prince Pedro received letters from his father, which he read surrounded by his waiting staff. When he had finished he raised his right hand and solemnly cried, "Victory or Death." The painter has chosen this scene as the subject of his picture.

BEAUTIFUL BUENOS AIRES, THE PARIS OF TH

THE HARBOR F

CONGRESSIONAL BUILDING AND INDEPENDENCE MONUMENT

PLAZA LIBERTAD, WITH THE BIG OPERA-HOUSE ON THE LEFT

Photos, Olds.

THE ARGENTINE HIPPODROME, THE LAR

TH ITS BUSY DOCKS

PLAZA DE MAYO, WITH THE PRESIDENT'S PALACE IN THE BACKGROUND

PLAZA SAN MARTIN—NATIONAL ART MUSEUM AND PLAZA HOTEL IN THE BACKGROUND

ND FINEST RACE TRACK IN THE WORLD

able to supply the people with much of their needs in sugar, cotton materials, and some other things. She has not yet become a manufacturing country, however, and most of her exports are products of the field, the forest and the mine. A large part of the coffee and rubber used in the world comes from Brazil, which also exports a quantity of cocoa. Much of the Amazon plain is covered with forest, in which many valuable timber trees are found. Gold and diamonds are exported from Brazil; manganese, a mineral which is of great importance in metal-working, is found in large quantities. There are large coal beds in the southern parts of the highlands, though the coal is not of good quality. Iron is found, and has been mined; and lead, copper, zinc, quicksilver, marble, salt and kaolin make up the list of minerals found in the country.

The rivers of the highlands give plenty of water power, and southern Brazil may some day be a mining and manufacturing country. This would be impossible in the north, where the climate is too hot and damp for white men to work in comfort.

The population of Brazil is said to be about 25,000,000, and of this number only about two million and a half are Indians. There are about three million and a half negroes, so you see they greatly outnumber the Indians. Half the population is said to be white, but most of the early Portuguese settlers intermarried with the Indians, and the greater number of the old Brazilian families have had Indian ancestors. A great many of the people are descended from Indians and negroes. Immigration into Brazil is large, and is made up chiefly of Italians, Portuguese, Spaniards and Germans.

About four-fifths of these millions of people are illiterate; that is to say, only two out of every ten of the population have had any education at all. Most of the Indian tribes are as wild and uncivilized as they were when the Portuguese first entered the country, and of course they are counted among the numbers of illiterate people. A large proportion of the negroes and mixed races also raise the numbers, and probably many of the immigrants from the south of Europe have had little chance of gaining education. The primary schools are free, but education is not compulsory.

Tobacco is grown in Brazil, principally in the state of Bahia, the state in which the Portuguese made their first settlement. In this picture the men are cutting tobacco, to be dried and tied into bales, which are sent to the cigar factories, or exported. Cigar-making is an important industry in Brazil and supplies work for many people. The tobacco, however, is not so good as that grown in the West Indies.

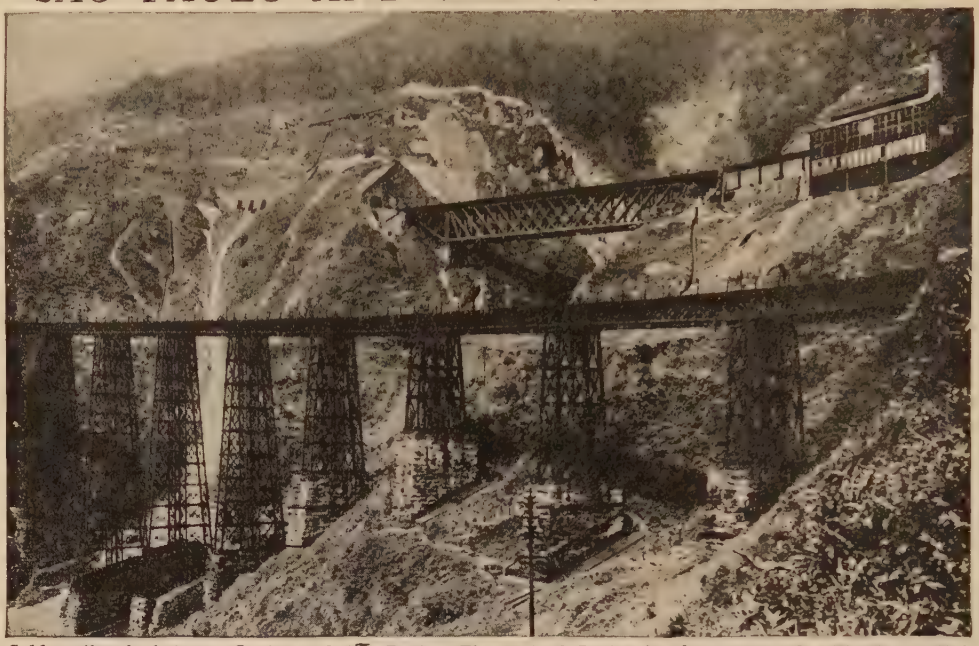
THE NEXT STORY OF ALL COUNTRIES IS ON PAGE 7097.

AVENUES OF MODERN RIO DE JANEIRO

The Avenida Rio Branco is a mile and a half in length. Five hundred and ninety buildings were pulled down to permit its construction in 1904. It is a most fashionable thoroughfare, and to it come daily the majority of the inhabitants of Rio. All cars lead to it, and in the more fashionable southern half the café-proprietors place their tables in the middle of the pavement. Its general aspect is very gay, and at its southern end are some very stately buildings, among them the Monroe Palace and the Municipal Theatre.

The Avenue of the Mangue Canal takes a place of honor among the parks of Rio, sometimes called the "City of Gardens." In the centre is the canal, and on either side are two rows of lofty royal palms and two roadways. Unfortunately, shabby, often hovel-like, buildings are to be found along the avenue.

SÃO PAULO AND THE PORT OF SANTOS



Cable railroads between Santos and São Paulo. The port of Santos is also connected with the capital by about 50 miles of railroad belonging to the São Paulo Railway, which also runs about 38 miles beyond the capital.

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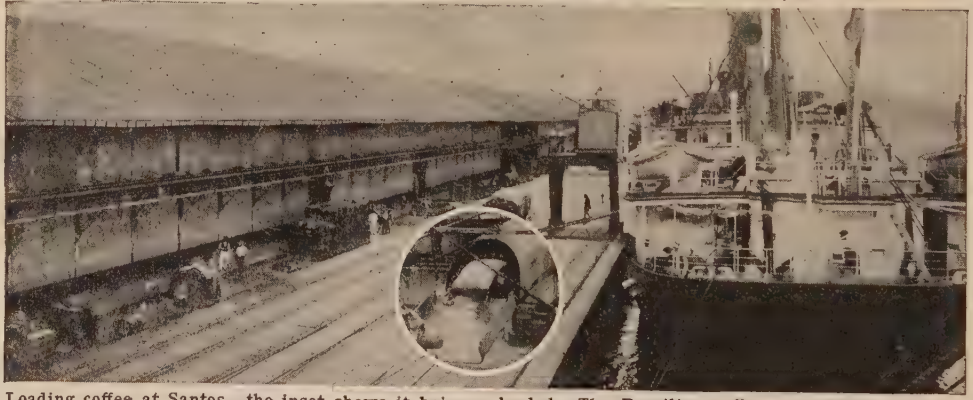
Stairway of the Municipal Theatre, São Paulo.

The Municipal Theatre, São Paulo.



Loading coffee at Santos—the inset shows it being unloaded. The Brazilian coffee export trade is very big. Since the Seventies there has been extensive growing of coffee on "fazendas," or coffee estates. The city is situated on the northern shore of the island of São Vicente, a strip of land just off the mainland.

SANTIAGO'S FINE BUILDINGS AND PARKS

The steep red porphyry crag of Santa Lucía, Santiago, Chile, where the first settlers withstood a siege.

The Museum of Fine Arts in Santiago, which is the largest city on the western slope of South America. The city is ancient, having been founded in 1541 by Pedro de Valdivia; but besides houses in the old Spanish style, it has modern public buildings. The inset shows a traffic policeman with his sign set for "Go."

Photos, copyright, E. M. Newman, from Publishers Photo Service.

VALPARAISO, THE CHIEF PORT OF CHILE

Valparaiso, the capital of the province of Valparaiso, Chile, is the chief seaport of the republic. The older portion of the city, which is the business part, extends along the shore of the bay. On the slope of the surrounding hills are the residential suburbs. The site of Valparaiso is magnificent.

This view shows us the harbor of Valparaiso. In the foreground is a fine monument to the navy, surmounted by a statue of Admiral Prat. The port is strongly fortified, and the Government maintains a large naval arsenal.

Alexander Wilson.

James D. Dana.

Henry D. Thoreau.

SOME MEN WHO LOVED NATURE

CONTINUED FROM 6926

IN the nineteenth century great advances were made in all branches of knowledge by learned men of nearly all the civilized countries. Especially was this so in the study of natural history. Before the opening of that century very little had been known about the birds, the plants, the animals and the earth structure of North America, but all is changed now, thanks to great naturalists. Some of the North American naturalists of whom we shall read were men who were born on this continent. Some came from Europe to make their homes here. There are so many who have helped to further the progress of science that it has been difficult to make a selection. We can give the lives of only a few.

To Alexander Wilson, poet and bird-lover, goes the honor of producing the first great work on the birds of North America, and he has been called the "Father of American Ornithology." Wilson was born in the Seedhills of Paisley, Renfrewshire, Scotland, in 1776. His mother intended that he should enter the ministry, but her early death interfered with that plan for his future. His father was poor and had a large family to support, so Alexander obtained only a moderate schooling. While very young he was employed as a cattle-herder, and at the age of thirteen he was apprenticed to the family occupation, weaving. His great ambition was to be a poet, and for the next few years he wrote verse in his spare time, but without much success. Some verses, written in his twenty-eighth year, landed him in prison as a result of a libel charge, and on his release he determined to emigrate to the United States.

For ten years he taught school in various villages around Philadelphia and as an avocation wrote poetry. In 1802, at Gray's Ferry, he met the botanist William Bartram, a son of the more famous John Bartram, and between the two men a close friendship sprang up. Inspired by Bartram, Wilson turned his attention to collecting birds of Eastern North America. It was necessary to draw the specimens he found, so he learned to draw and to make etchings. An editorial position in Philadelphia enabled him to give up teaching, and he therefore had more time to follow his hobby. In 1805 he determined to publish his drawings and observations. But before he could do so he had to find 250 subscribers who would buy copies of his work at the price of $120 a set. In search of such nature-lovers he traveled as far west as the Mississippi River and as far south as New Orleans.

His traveling, on horseback or on foot, was very arduous, but it gave him opportunities to find more birds.

Unfortunately he had to do so much of the etching and coloring of his bird designs that he overworked himself. In the summer of 1813, when the eighth volume of his American Ornithology had gone to press, he died. His friend Ord completed the ninth volume from Wilson's notes and drawings.

Alexander Wilson was the pioneer in his line of work, and although he had to work under difficulties, it is remarkable that men who followed in his footsteps have added

From an engraving of the portrait by F. Cruikshank.
John J. Audubon.

to his list only twenty-three land birds native to the country east of the Alleghenies and north of Florida. Wilson's bird studies were made within a period of ten years, but of him the great Cuvier wrote: "He has treated of American birds better than those of Europe have been treated."

John James Audubon, Wilson's successor, brought still more glory to the ornithologists of the New World. His father was a French admiral who had estates in France, San Domingo and Pennsylvania. His mother was a lady of Spanish descent and a native of Louisiana, at that time a French possession, where the boy was born, probably in 1780. In the negro uprising in San Domingo Madame Audubon was killed, and Admiral Audubon took his infant son back to France. John James was educated in Paris, where he learned to paint under a famous master. When he was seventeen years of age he was sent to the United States to look after his father's property. During this period he drew many birds, but had no scientific interest in them. He went back to France for two years, but returned to the United States in 1806 with a business partner. He soon married and set up a store in Louisville, Kentucky.

THE WONDERFUL PICTURES WHICH AUDUBON DREW

It was at Louisville that he met Alexander Wilson and saw the first volume of The American Ornithology. Audubon was not meant to be a business man, and eventually he lost all his money and was forced to turn to his pencil for support. For some years he depended on the portraits he drew or upon giving lessons in drawing, fencing and dancing. Nevertheless, he kept on drawing birds, and roamed over the country to find new specimens. A meeting with Charles Lucien Bonaparte in 1824 gave him the idea of publishing his drawings. He took them to Philadelphia for that purpose, but met with little encouragement. Two years later he went to England and Scotland, where he was received with great honor, but still found it difficult to secure subscribers for the publication of his work. However, continued effort and the support of a few staunch friends overcame his difficulties, and arrangements were made to print his Birds of America. The descriptive matter, published separately, was called American Ornithological Biography. During the publication of these works Audubon returned to the United States and made excursions into Canada as well as to lesser-known regions of the United States. There were in the completed ornithology 435 colored plates, each about three by two and a half feet in size, containing 1,055 figures of birds, natural size. Later, several editions with smaller plates were published.

In 1842 Audubon bought an estate on the Hudson, Audubon Park, which is now a part of New York City. Four years later the publication of his Quadrupeds of America was begun, but it was not completed until after his death. In 1848 the naturalist's mind failed, and his death occurred in 1851.

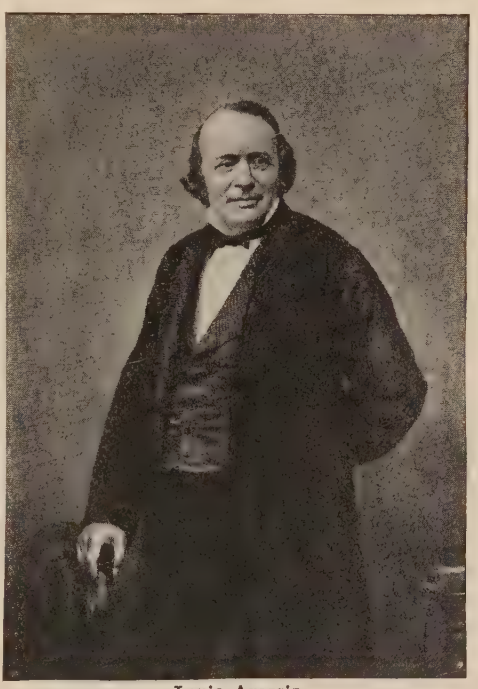
LOUIS AGASSIZ, A GREAT SCIENTIST AND A GREAT TEACHER

Louis Agassiz, born in Switzerland in 1807, had a truly remarkable career. His father was a poor clergyman who was determined that his son should be a business man or a physician. But Louis was a born naturalist. Until he was ten years old he studied with his parents, and for recreation he roamed the valleys and mountains around his home, giving earnest attention to the rocks and plants and to animal and bird life. At ten years of age he entered the University of Bienne; at twelve he had completed a remarkable collection of plants and animals. Two years later he became a student at the College of Lausanne. It was very difficult for him to obtain the books he wanted to read, so he borrowed precious volumes and copied them by hand.

Rather against his father's wishes he entered the University of Heidelberg in 1820. The good clergyman felt that the career of a naturalist was not a profitable one, so Louis decided to take his medical degree to please his parents. While he was at the University of Munich he was given the material of the Spix Brazilian Expedition to report upon. This work he did at night, pursuing his medical studies during the day. The report which he presented to the Bavarian Government when he was twenty-one years old won him immediate fame, and he was given the degree of Doctor of Philosophy as well as that of Doctor of Medicine. At twenty-three Louis Agassiz was an author and naturalist of European reputation. At this period Cuvier became his friend and he went to Paris, but, as his father had feared, he made very little money. After producing the noted Researches among the Fossil Fishes he made a trip to England, where he was hailed with acclaim by the great English scientists.

In 1846 the king of Prussia gave him fifteen thousand francs for investigation work, and he set out for a lecture tour in the United States. He received a royal welcome, not only for his work, but for his charming personality; and every effort was made to persuade him to make his home in the United States. His decision to remain was made when the king of Prussia gave him an honorable discharge from his service. At once Agassiz sent for his family. At the age of forty he became a professor at Harvard.

This marked an epoch in the teaching of science on this continent, and under Agassiz's teaching a great popular revival in the subject began. He created the Museum of Comparative Zoölogy at Cambridge, and was as ardent a collector in America as he had been in Europe. He visited all parts of his adopted country from Canada to the Gulf of Mexico and from the Atlantic to the Pacific oceans. He made trips to Brazil, Cuba and around Cape Horn to San Francisco. Thanks to the gift of John Anderson, of New York, who gave the island of Penikese, Massachusetts, he started a school and laboratory for marine study. Many of the leading scientists and naturalists of the day were his students.



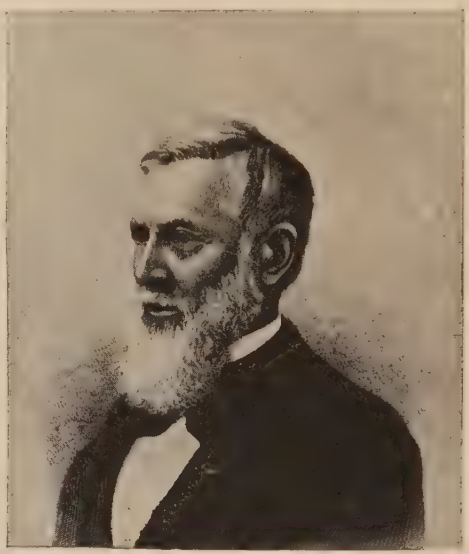
Louis Agassiz.

The European countries offered him many inducements to return to the Old World, but Agassiz would accept none of them. He was content with his new country. In 1873 the continued hard work that had occupied him all his life began to tell upon his health, and he knew that his end was drawing near. "I want rest," he said; "I am ready to go. I am ready to go, but I will work while I live. While I have strength I will labor." On December 14, 1873, the end

came, and all the world mourned for the great man who had brought the learning and culture of the Old World to inspire the thought and aims of the New.

ASA GRAY, WHO SYSTEMATIZED THE BOTANY OF NORTH AMERICA

The name of Asa Gray, the foremost American botanist during the last century, is well known to boys and girls, for his textbook is still in use in many schools. Asa Gray was born in Sauquoit, New York, in 1810. His father was a tanner, and while very young the boy had to help feed the bark-mill and drive the old horse that furnished the power. Asa, however, was unusually bright, and at six years of age he was a champion speller at the different spelling-matches held in the country. His schooling ended when he was fifteen years old, and his father persuaded him to study medicine. He took his medical degree before he was twenty-one, but he did not practice, because his interest was in botany. When he was seventeen he had read something on the subject and had bought a manual of botany. This had led to collecting and naming the plants in the vicinity. Before he graduated in medicine he had met Dr. John Torrey, the best-known American botanist of that period, and a friendship ensued which lasted until the death of the latter.



Engraved for the Eclectic by J. J. Cade, New York.
Asa Gray.

To pursue the career of a botanist, Gray taught school in the winter and made collecting tours in the summer for six years. Then through Dr. Torrey's influence he was given a post with the New York Lyceum of Natural History. He thought of going with the Wilkes Expedition to the Antarctic, but decided instead to join with Dr. Torrey in writing a book on botany called Flora of North America. He was appointed professor of natural history in the University of Michigan, but before taking this position he went to Europe, where he met the most distinguished European botanists. He never did lecture at Michigan because he was appointed to Harvard shortly after his return.

Gray's Manual of Botany made its first appearance in 1848, and at once it became the standard authority in the United States. Other editions followed, and Gray's name became a household word. He wrote many other botanical works and visited all sections of the United States in the years that followed. On his seventy-fifth birthday all botanists in the United States joined in presenting Dr. Gray with a silver memorial vase to show the esteem in which he was held. On that occasion James Russell Lowell wrote the well-known verse:

> Just Fate, prolong his life well spent
> Whose indefatigable hours
> Have been as gaily innocent
> And fragrant as his flowers.

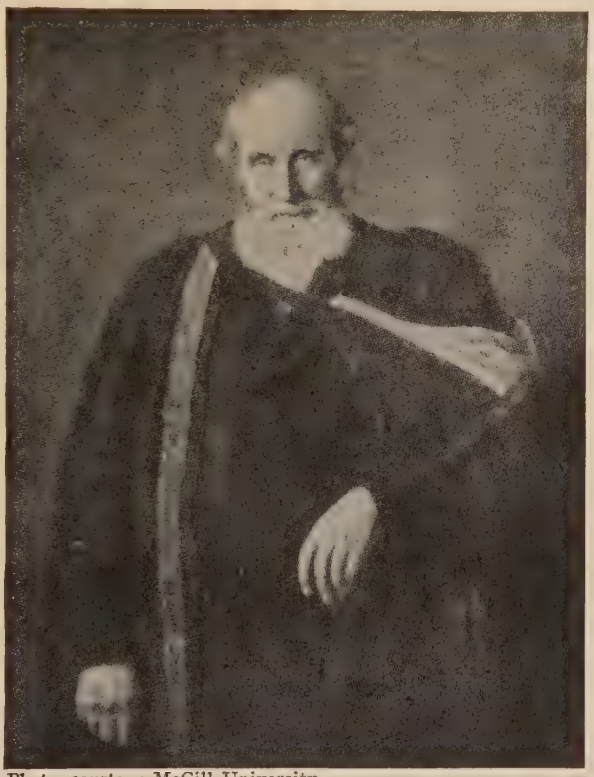
When Dr. Gray died, in 1888, he had left behind him a science cleared of the disorder which had marked it when he first became interested in botany, sixty years before.

JAMES DWIGHT DANA, THE EMINENT GEOLOGIST

In the realm of geology the name of James Dwight Dana is the most notable of the scientists who became famous during the nineteenth century. Dana was born in Utica, New York, in 1813, and lived until 1895. His parents were intelligent religious people who were able and anxious to give their son all the advantages of the best educational institutions. At school in Utica young Dana became interested in science, and at Yale the influence of the elder Benjamin Silliman turned his attention to geology. After graduation he became a schoolmaster in the navy and went for a trip through the Mediterranean, but he resigned his posi-

tion after a short time. He was appointed assistant to Professor Silliman, and at the age of twenty-four brought out his System of Mineralogy, which has been the foundation for most modern books on that subject.

From 1838 to 1842 Dana was a member of the Wilkes Expedition which was searching for the Antarctic continent. This took him around the world and enabled him to carry out zoölogical and geological studies in South America, the Pacific islands, Australasia and South Africa. Preparing reports on what he had seen and on the scientific collections of the expedition occupied him for some years afterward. In 1850 he received a professorship at Yale, and his connection with that university he retained until his death. In 1862 he produced his Manual of Geology, which was his greatest work, and in addition he published over two hundred books and pamphlets on zoölogy, geology and travel.



Photo, courtesy McGill University.
Sir J. William Dawson.

HENRY DAVID THOREAU, LOVER OF NATURE

There are two famous books—A Week on the Concord and Merrimac Rivers, and Walden, or Life in the Woods—which have won a leading place in American literature. Their author, Henry David Thoreau, was one of the most extraordinary men of the last century, and a born naturalist. Concord, Massachusetts, was the place of his birth, and the date was 1817. Henry's father made lead-pencils for a living, and Henry learned this trade as a young boy.

People who knew him as a boy were amazed at his power over animals and at their trust in him. Foxes went to him for protection. Squirrels would jump from the trees to his shoulder. Birds were not afraid of him. He could even put his hand into a stream and catch a fish without the finny creature's objecting. He began to collect objects of nature while yet very young, and he left a diary in which he wrote his observations of the skies, woods, birds, animals and plants.

Thoreau graduated from Harvard and took up teaching and writing. This did not satisfy him. He went to live with Emerson and Hawthorne at Brook Farm at West Roxbury, but this did not satisfy him either, though he remained on the farm for three years.

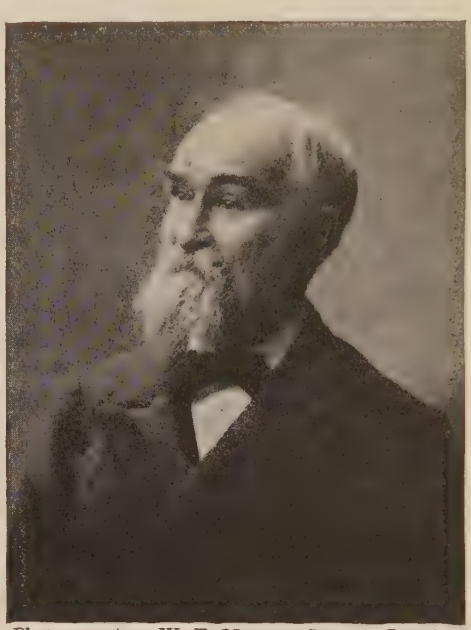
When he was twenty-eight years old he decided to go and live in the woods alone. He built his own cabin, and made his own simple furniture, consisting of a bed, a table, three chairs, a desk, a pair of tongs, a mirror, a kettle, a frying-pan, a wash-bowl, a lamp, two jugs and a cup. Below his house stretched Walden Pond, in which he bathed. He planted a garden and proved that a man could live on what he raised.

People said that he looked like a "wise wild beast," but Thoreau did not care: he was now happy and contented. It was at Walden that he wrote the two books already mentioned. After two years of this life in the woods he had to give it up because his father had died and his relatives were without means of sup-

port. To earn money he made pencils, wrote and lectured until his death, in 1862.

Sir William Dawson, the Great Canadian Geologist

On October 13, 1820, there was born in Pictou, Nova Scotia, a boy who became, not only the leading geologist in Canada, but one of the leading geologists of the world. This boy was John William Dawson, better known by the title Sir William Dawson which he gained many years later. His father had come from Crombie, Scotland, and for a while had prospered. Business reverses came to him, however, about the time of John William's birth, and cast a shadow over the family for the next few years. Lack of money has never hindered Scots or those of Scottish descent from obtaining an education, and the Dawsons believed that education was the most useful thing in the world. So young John William was sent to Pictou Academy.



Photo, courtesy W. T. Macoun, Ottawa, Canada.
John Macoun.

The surroundings of the Dawson home yielded a rich store of plants, fossils, insects and birds, and the boy's attention was attracted to them at an early age. One morning he was making a slate-pencil from a flake of shale when he was surprised to find upon the stone a "delicate tracing in black of a leaf like that of a fern." That was his first geological discovery, and from that moment he began to collect specimens of rocks and minerals. When he was fifteen years old he obtained a copy of Mohs's Mineralogy, which taught him something of the wonders of mineral crystals. So interested was he that when he was sixteen years old he lectured before a local society on the structure and history of the earth! It is curious to realize that the study of the Hebrew language was also one of William Dawson's hobbies.

In 1840 young Dawson sailed for Scotland to spend a year at Edinburgh University, where he studied chemistry, physics and especially geology. Upon his return to Canada he became acquainted with two noted geologists—Sir Charles Lyell, an English visitor, and Sir William Logan—and with both men he did geological work that laid the foundation of his fame. His researches into the secrets of the earth took him all over the then known Canada, part of the United States, and much of Europe, and his writings on some of his discoveries are still authorities. In 1854 William Dawson became principal of Canada's oldest and most famous university, McGill. In 1882 Queen Victoria made him a companion of the Order of St. Michael and St. George, and he became Sir William Dawson. He lived until 1899 and was recognized internationally as a great man and a great geologist.

John Macoun, Naturalist

John Macoun, the Canadian explorer and naturalist, must be included in our story, for he was, as Ernest Thompson-Seton expressed it, "the father of exact natural history in Canada." He was born in Ireland in 1831, but in 1850 he migrated to Canada and took up farming in Ontario. Six years later he was engaged in teaching school at a salary of $14 a month. At this time he became interested in botany and other natural sciences, and was soon teaching these subjects. Ten years of teaching, collecting and research work made Macoun's name known not only in Canada, but in the United States and Europe.

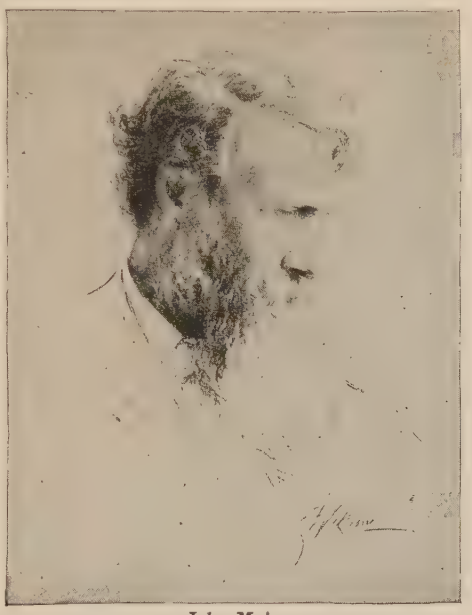
In 1872 Macoun became botanist to the expedition which crossed the prairies and the Rocky Mountains in search of a route for the Canadian Pacific Railway. That was the first of many journeys and explorations all over Canada from the Yukon to Nova Scotia. A few years

later he began his Catalogue of Canadian Plants. This was followed by a Catalogue of Canadian Birds. Both of these records are counted the best authorities on the subjects. His two sons, William and James, followed in their father's footsteps, and often were companions and co-workers with him. For many years Macoun was assistant director and naturalist to the Geological Society of Canada. His collections of flora and fauna were the foundation of the Victoria Memorial Museum in Ottawa, the capital of the Dominion. Macoun died in 1920. It is interesting to know that over fifty species of plants, mosses, lichens, insects and fish have been named after him.

JOHN MUIR, WHO LOVED NATURE

John Muir, the naturalist who loved mountains, was born in Dunbar, Scotland, in 1838, and lived the ordinary life of a Scottish laddie until he was eleven years old. Then one night when he was preparing his lesson for the next day at school his father told him that he need not bother with study that evening because the family would leave for America in the morning! It was true, and in a few weeks the Muir family were home-steading in Wisconsin. John had many tasks to do, for he was bright, willing and strong; but whether he was plowing or chopping trees, he delighted in the flowers, trees and wood creatures about him. When he was nineteen he was the best plowman in the neighborhood. He dug a ninety-foot well without assistance, although he had a narrow escape from suffocation through choke damp.

As his father was not a man who encouraged reading, John began to buy a little library of his own. His father would not permit his sons to remain up at night reading. John did so and was reproved. Finally his father told him he might get up and read as early in the morning as he liked. This was a wonderful opportunity for young John, who used to rise at one o'clock in the morning. These precious early hours he spent in reading or working at inventions of his own in a tiny workshop in the cellar. He made many curious machines out of wood. Finally he took his inventions to the state fair at Madison, where they attracted much attention. The visit to Madison gave him the ambition to go to the state university. He had to provide his own fees and living expenses, and often he lived on fifty cents a week. After leaving college his eyesight failed, and he was told that he might become blind. At once he determined to see as much of the world as possible before such a calamity came upon him. He set out on foot westward until he came to the Sierra Nevada Mountains, which afterward became "home" to him.



John Muir.

For months he tramped the mountains, until he knew every foot of them. He made a visit to San Francisco and married Louie Strentzel, daughter of John Strentzel, a Polish revolutionist. He took up fruit-farming, but kept on studying Nature and the ways of her children. He went to Alaska, and during his explorations discovered Glacier Bay and the Muir Glacier. Later he circled the world to study forests. It was largely through his efforts that the Yosemite Valley became a National Park. Muir's books and articles brought him great fame, and he was invited to fill several chairs in eastern universities. To these invitations he always said there were too many men teaching the things they had learned out of books: what was needed was more original investigators to write new books. This grand old naturalist died in 1914.

JOHN BURROUGHS, LOVER OF NATURE, AND AUTHOR

John Burroughs, or "John o' Birds," as his friends in later years lovingly called him, was born in Roxbury, New York, in 1837. He came of a long line of farmers, although his father had been a teacher in his youth. His mother was a plain, unlettered woman who treated John with great tenderness and for whom he had the deepest love. There were ten children in the family, and so the house was crowded.

John Burroughs' earliest recollection was of a great bird, a hawk, which sailed round in long circles above him. He was then about three years old. His school-days were happy, although the usual chores on the farm interfered with his playtime. He was a lover of the woods and fields from his earliest thinking years. By doing the work of a hired man and by teaching he was able to take a course at an institute not far from his home. It was while he was teaching near West Point that he first read the works of Audubon and was inspired to study birds. Afterward Emerson and Thoreau added fuel to the fire of his new ambition.

© Kadel & Herbert.
John Burroughs and Thomas A. Edison.

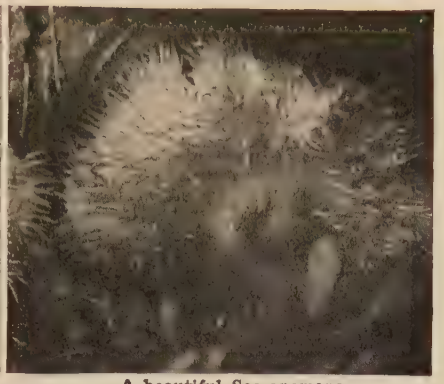
Mr. Burroughs obtained a position as a government clerk in Washington. This he held for ten years. All his spare time during this period was spent in studying nature and writing about it. He shot birds and stuffed and mounted them. In Washington began the friendship with Walt Whitman, and Notes on Walt Whitman, as a Poet and Person, published in 1867, was Burroughs' first book. Wake Robin, his first nature book, was published four years later.

After a trip to England on business he gave up his position and engaged in fruit-farming at West Park, New York, and this was his home until the end of his life. His cabin study, Slabsides, was built on a hill near the house, and it became a centre for visitors from all over the world. John Burroughs made journeys to Europe, to the West Indies, to Alaska and to all parts of the United States during the next few years. He wrote steadily and delightfully of what he had seen and the conclusions he had come to regarding things of nature. In 1903 he was the man chosen by President Roosevelt to be his companion on the trip through the Yellowstone National Park. He died in March, 1921. He was held in great affection by all nature-lovers.

There were many other brilliant naturalists in the nineteenth century, but those we have just read about were the outstanding ones. They made the natural history of North America known to the outside world, and they were the inspiration for the work that modern naturalists are carrying on. When we consider the difficulties they met and conquered we may well be amazed. To-day the boy with a taste for natural history has every opportunity to advance in his work. Some of these pioneers had little encouragement and met with many obstacles.

THE NEXT STORY OF MEN AND WOMEN IS ON PAGE 7201.

A typical Sea-urchin.



A beautiful Sea-anemone.

QUEER AND LOWLY CREATURES

CONTINUED FROM 6896

ONE of the oddest things that ever was alive is surely the Sponge, the "Companion of the Bath." Let us examine him with respect and intelligent questioning. He will repay our interest.

Like ourselves, to whose comfort and cleanliness it ministers, it once had life, movement, appetite, and, in its early youth, extreme activity.

This curious honeycombed substance, so light and elastic when dry, so soft and collapsible when wet, is simply the silken, fibrous skeleton of an animal. If we catch that animal young enough, we may see it scurrying about in the sea as if it would "sail beyond the sunset and the baths of all the western stars" until it dies.

The lower half of this fuzzy little navigator is bearded with hair-like processes waving like tiny oars or arms, and so propelling it through the water. When it desires to progress in a straight line, it does so fairly well, but when it no longer directs its course, it stops and its still-waving cilia make it spin like a whirligig beetle.

This consuming activity lasts but a short while. Like the baby oyster, the youthful sponge thinks better, or worse, of its days of adventure; it sinks to the bottom of the sea, attaches itself to rock or weed, or to some shelled animal, and its roamings are at an end.

The oval body with which it set out in life undergoes marked changes. The ciliated part is drawn inward, and the globe-shaped little creature becomes cup-shaped. Within there is busy reconstruction of parts. The cell masses are changed into canals in which there is a jelly-like mass of flesh equipped with more of the vibrating processes to draw water and food into those canals.

The tiny pinhole-like perforations in our bath sponge open into the canals by which water is conveyed to bear life-sustaining oxygen to the sponge and also to feed it. Each draft of water taken in holds organic and vegetable matter which, caught and strained away by a delicate membrane at the junction of the little canals, is digested in the sponge's alimentary system. The exhausted water, together with waste products of the body, is then forced out of the large openings which we observe, and so all is well.

The sponge grows as it feeds; it gives rise in due course to eggs which at the right time are washed out of the parent body in the flood of water ejected from the main channels through the larger openings. These hatch into free-roving little animals which later on become sedentary.

Catch a sponge alive, confine it in a sea-pond, and let it have enough water for breathing and nutriment, and it will continue its growth. When sponge-fishers have little sponges or too many larger sponges in hand, they do keep them in this way and feed them. Thus, you see, it is really true about giving the sponge his breakfast. See page 2915.

So far we have mentioned only the sponges which are important for trade, and but one method of reproduction. In most cases multiplication is effected by the budding-off of tiny sponges from the parent. We can watch this process for ourselves in the case of one of the fresh-water sponges, the Spongilla. Life passes from the parent sponge with the fading of summer, but from its substance new life takes rise, to drift away with the spring and form new sponges.

As Nature takes more than one means to increase her store of sponges, so she has claimed many different situations for this branch of her children—inshore waters, deep-sea abysses, and all the ranges of soundings between. Silicious spicules, or needles, enter into the composition of many species, but these are not of commercial value. In the so-called glass sponges the silica is of the thinnest, most brittle texture and interwoven or fitted to form a glass network of great beauty. Yet this extraordinary substance serves as an anchorage in the Japanese *Hyalonema,* which is attached to the mud by a bundle of strands of "glass rope," which might have been produced by a human glassblower of unrefined art. In the *Semperella* the attachment is not a glass rope but an amazing glass-like spicule as thick as a man's little finger and nine feet long.

Many sponges bore into the solid rock of limestone cliffs and destroy it. They bore deep in the yielding chalk, open the way for disrupting water, and make destruction sure, if slow. Others bore into various shells—the oyster, mussel, scallop—causing them to go to pieces. *Cliona sulphurea* has even been found penetrating a little way into hard marble, and it is very destructive with coral.

Of course, we must not lay the blame for this sort of work to the account of all the sponges which we see by the sea between high tide and low; each genus has its station, its own sea-keep, its home in fresh water, its way upon the rock. There is the Breadcrumb Sponge, a colony of many sponges, living on our shores; there are the Mermaid's Gloves cast up, living, every rough tide, and sponges of all sorts through all seas, till we come to the tremendous Neptune's Cup, a marvelous piece of architecture three or four feet high, built up by many sponges which act as one, which raise the great stalk, then the vase-shaped cup, and make it lovely as the work of an old Etruscan potter.

Now let us turn to the very opposite of the horny sponges, the coral's relatives, those flimsy, transparent disks of life that float in every sea, the Jellyfishes.

These, with the corals and anemones, are called the *Cœlenterata,* and share the common peculiarity of an all round structure, so to speak. That is, they have no "sides," but are circular and symmetrical to a central axis. Moreover, they have no complicated internal divisions of the body like the higher animals, but are furnished with a digestive system which is not a closed canal, as we should expect to find, but is practically the entire interior of the body. At first sight they appear the most defenseless of creatures, but they have their stings and poisoned barbs most powerful.

THE DISKS WITH WHICH THE COMB-JELLIES CATCH THEIR PREY

All our rules have their exceptions, and we must hasten to note some here. For the *Ctenophora,* or comb-jellies, have no stinging cells, but multitudes of tiny adhesive disks which clutch and secure minute prey. Then, another of the exceptions, the lovely Venus's Girdle, is not circular, like the rest, but exists as a broad ribbon of exquisite life, fringed with cilia which bring food within range. Some of this group have taken to creeping along the sea-bed, and so have assumed a drawn-out two-sided form.

Among the *Cœlenterata* we have an example of a dazzling contrivance on the part of Nature for distributing her family, in what is called "alteration of generations." It is not peculiar to this group, but here we may examine the method. Suppose we have a jellyfish mass which, as with the sponges, includes many individuals which budded from the original parent but remained attached to it. If these went on budding and growing, the mass would become inconveniently large. If the component parts all produced eggs,

LIVING FLOWERS OF THE SEA

Sea-anemones are well named, for they are remarkably like flowers, and in form and color are almost as widely varied as a garden. Here we show about sixty of these beautiful creatures.

NORTH ATLANTIC ANEMONES

1. Eyed Anemone. 2. Trumplet. 3. Cave-dweller. 4. Latticed Corklet. 5. Plume Anemone.
6. Gold-spangled Anemone. 7. Rosy Anemone. 8. Deeplet. 9. Opelet. 10. Marigold Wartlet.
11. Red-speckled Pimplet. 12. Parasite Anemone. 13. Glaucous Pimplet. 14. Yellow Imperial.
15. Dahlia Wartlet. 16. Snake-locked Anemone. 17. Scarlet-fringed Anemone.

NORTH ATLANTIC ANEMONES

1. Necklet. 2. Walled Corklet. 3. Scarlet Pearlet. 4. Diadem Pimplet. 5. Painted Pufflet. 6. Arrow Muzzlet. 7. Orange-disked Anemone. 8. Gem Pimplet. 9. Ringed Deeplet. 10. Gapelet. 11. Waved Muzzlet. 12. Variety of Opelet. 13. Crock. 14. Crimson Imperial. 15. Vestlet. 16. Beadlet. 17. Variety of Beadlet. 18. Eyelet. 19. Snowy Anemone.

AMERICAN AND EUROPEAN ANEMONES

1. Variety of Eloactis Mazelli. 2. Neapolitan Mud Flower. 3. Variety of Horse Beadlet. 4. Vestlet. 5. Crimson Trumplet. 6. Beautiful Ragactis. 7. Margined Cladactis. 8. Eloactis Mazelli. 9. Hard Pimplet (closed). 10. Variety of Gem Pimplet. 11. Orange Cereactis. 12. Transparent Trumplet. 13. Globehorn. 14. Cloak Anemone. 15. Pufflet. 16. Color-changing Trumplet.

MEDITERRANEAN AND ATLANTIC ANEMONES

1. Parasitic Anemone. 2. Mossy Heterodactyle. 3. Opelet. 4. Slimy Corklet. 5. Snake-locked Anemone. 6. Variety of Daisy Sun-ray. 7. Daisy Sun-ray. 8. Elongated Corklet. 9. Hemprich's Heterodactyle. 10. Solid-furrow Anemone. 11. Horse Beadlet. 12. Sandy Pimplet. 13. Variety of Daisy Sun-ray. 14. Hard Pimplet.

they would overcrowd the sea in their neighborhood and bring about starvation for themselves and all their kind thereabouts.

How the jellyfish families are distributed over big areas

Now see what happens. The many-in-one are called a "stock." Parts of the stock, charged with eggs, break away, like the gemmules of the sponge, float off and colonize some new area of water, where the eggs are produced. Some of these sink and form new stocks, which will bud off new attached members. Others of the eggs, however, will hatch straightway into free-swimming jellyfish. The plan is ancient and has been employed in many forms of life by Nature. In the jellyfishes it has succeeded wonderfully.

The type is represented in all waters, from our own shores, through the tropics, and away toward the waters of both the Poles. One would expect the warm-water regions to produce the giants, and mighty forms are there, but probably the chill waters of the Far North and South have the Titans, for one of the recent Antarctic expeditions hauled up from the water at the foot of the Great Ice Barrier a jellyfish which was twenty inches across the upper part and weighed over ninety pounds, while the great pink stinging *Cyanea* of the North Atlantic sometimes measures eight feet across its umbrella!

The floating umbrellas with a mass of waving arms

How much such a monster would weigh after its watery contents had escaped, one cannot venture to guess, but we have all heard of farmers carting jellyfish in loads, a ton and more at a time, as manure for their land, only to find, as children find by the shore, that their sea-booty resolved itself into watery films.

Jellyfish life extends into many species and is complicated and fascinating. In general we know that the body, a mass of glassy jelly inclosed between the upper and lower sides of the bell, or umbrella, bears a number of arms, or tentacles, and that from these issue the abominable stinging barbs. These are tiny threads with a dart-like head which lie coiled lasso-like in batteries of minute "thread-cells." They are violently ejected when touched, and cause a severe aching pain as they penetrate the skin.

In the jellyfish, of which the *Siphonophora* are the highest form, we have the same system of stocks and single individuals as in the former species, but still more remarkably developed. Here in a single floating mass we have congregated together a series of individuals united, yet recognizable as many in one.

The division of labor in the jellyfish colony

Such a jellyfish colony is more socialistic than a community of ants or bees; its labors are subdivided yet co-ordinated, as in mass production in a factory. There are jellyfish in the united mass which propel the whole colony along, their function being to take in water, contract and squirt it out, and in that way row the living city about. Then there are others which guard the colony from offense, like the huge-jawed soldiers of the warrior ant colonies. In addition there are the members which produce eggs, or buds, and finally those which collect the food, digest it and pass the nutritive result from end to end of the entire body of many individuals in one.

Of the *Siphonophora,* the Portuguese Man-of-War is the climax of jellyfish perfection, a thing of exquisitely radiant colors supported at the water surface by a float like a luminous inflated sack, eight or ten inches long and six inches in diameter, with a living nursery attached to its under-side, and stinging tentacles many feet long streaming like a corrosive battery far in the water.

There are free-swimming jellyfish, in the *Hydromedusæ,* which are solitary and must fight and fend for themselves. Extraordinary facts regarding food supply have been discovered concerning these. Not only do they show instinctive genius in catching food with their tentacles: they are known to collect food which falls on the upper side of the bell, securing this supply partly by the rhythmic movements of the bell and partly by the action of minute cilia.

The united result is that the prey or organic matter is gathered into little heaps, mixed with mucus, brought to the finely fringed edge of the upper side of the bell, then, by means not yet discovered, conveyed to the under-side, and so to the tentacles and thence to the slit-like mouth.

The tiny orphans which go to the jellyfish for protection

Included in the diet of these jellyfish it is surprising to find the tiny larvæ of oysters, whelks and the like, eggs of fish,

little crustaceans, tiny bristleworms and multitudes of algæ. So the jellyfish is a free feeder, and takes things that might become food for man. On the other hand, he swallows the enemies of our fishes and molluscs, and in some cases is a benevolent nursemaid to many kinds of fishes.

Baby herrings, baby codfish, and a multitude of other friendless orphans which later may come to table in breadcrumbs or batter, look to the jellyfish for shelter. But why does it not sting them to death as it stings other fish?

Certain crustaceans whose hard coats make them indifferent to its stings play the brigand to the jellyfish; they attach themselves to it and actually take the food out of its mouth. That is disastrous to the jellyfish's prospects of long life. Now, the little fishes which it shelters are the very ones which need crustaceans as the main part of their diet. So, when the robber is pillaging the mouth of the jellyfish, the welcome fish swim up and devour the intruder.

For that service they are entertained without harm by the master of barbs and stings. But let an enemy of those fish pursue them within range of the jellyfish, then out go the stings, and the foe is either stunned and caught, or so severely punished that it is glad to escape with bare life.

THE QUAINT ANIMAL WHICH IS LIKE A FLOWER IN APPEARANCE

A similar plan of mutual aid extends between the Sea-anemones, on the one hand, and some other types of life—crabs, whelks, fishes, even actual vegetation—on the other hand. For, in spite of the name, the sea-anemone is not a vegetable, like the plant with which it co-operates. It is a true animal, low down in the scale like the sponge, but with a somewhat flower-like appearance.

Anemone it certainly is not, even in outline. We might liken it to some exquisite daisy, chrysanthemum or dahlia, perhaps, but not accurately to the delicate windflower. No matter, a sea-anemone flourishes as lustily by this name as any other, and it is a thing of rare beauty and wonder to all who have eyes to see and access to its home.

The body, with its leathery covering and strong muscular substance, is always heavily fringed with tentacles about the mouth, and these tentacles are armed with minute thread-cells which bear poison, so that the arms not only cling but sting. The strength of a single tentacle may be insignificant, but the drawing power of the entire assembly is astonishing. They cannot pull our finger into the interior of the animal, but the force is noticeable even in the small species which are found round our coasts.

THE ANEMONE WHICH MADE A MEAL OF A PENNY

The anemones are sightless, but the possession in some species of brightly colored bead-like prominences at the base of the tentacles around the mouth suggests that they are sensitive to light.

Touch and the power to absorb seem the chief senses of the anemone. One has been known to swallow a penny. Another was fed with eleven small crabs in succession. This one was exposed in a rocky pool whence the tide had retreated, and it clung, neatly folded in, looking like a large red jujube.

But it needed only a touch to cause it to thrust out its tentacles and to take in the offered crab. Again and again it accepted the offering, till it bulged with live stock. Why did not the desperate little crabs eat their way out? The anemone, before it swallows them, is able to paralyze their action, and thus they are helpless.

THE NEW ANEMONES WHICH GROW LIKE BUDS ON A STALK

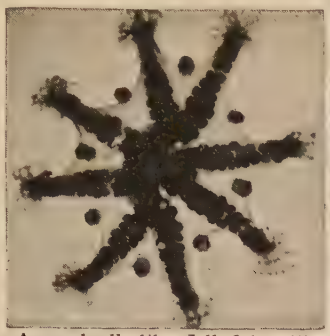
All the anemones are sedentary, attached by the suction of the basal disk to rock or sea vegetation, unless they anchor themselves to a moving animal, or, as happens with several species, burrow into the sand.

Sometimes new anemones arise by an actual division or splitting of the original animal, but as a rule eggs are laid within the parent body and hatch there, and the larvæ swim out when ready, or are ejected in a jet of water which passes out of the adult's mouth.

Great interest attaches to the feeding and general life habits of the anemones, but if one would preserve his poetic conception of their beauty and charm he had better not attend their dinner-table. No siren, no monster of the sea, could ever have been so frightful to ancient human imagination as an anemone must be to the fishes and crustaceans which it draws helpless into its insatiable maw.

Nevertheless, there is nothing lovelier

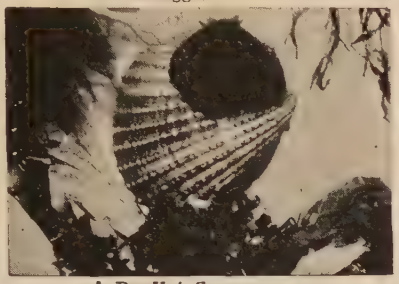
NATURE'S LOWLY CHILDREN



An umbrella-like Jellyfish with its eggs.

A Sea-anemone in a rock pool.

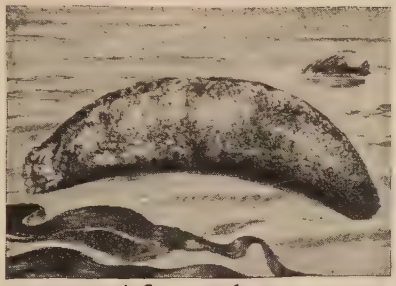
A Starfish opening an oyster shell.



A Beadlet Sea-anemone on a cockle shell.

A Sea-pen.

A long-spined Sea-urchin.



A Sea-cucumber.

Venus's Girdle.

A Sea-fan.

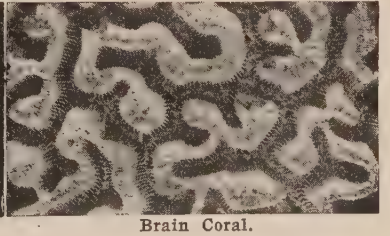
A Disk Jellyfish.*

Bird's-foot Starfish.

Beadlet Sea-anemone with tentacles expanded.

Red Coral.

A Starfish.



Brain Coral.

The pictures on this page are by Messrs. Berridge, Martin Duncan, Johnson, Ward, and others.

*Courtesy American Museum of Natural History.

in the seas than the anemone, no richer hues in the rainbow. There is no garden in the world more rich and varied in color and design than sea-deeps where tropical and subtropical varieties spread their gorgeous filaments and ravenously prey. Off the coasts of California and the islands of the West and East Indies there are wonderful sea-gardens which, because of the clearness of the water, we can look right down into from a glass-bottomed boat.

It is but a step from an anemone to a Coral Polyp, though no anemone ever furnishes itself with a hard skeleton. The coral polyps, on the other hand, are the foremost builders in the realm of Nature. Dead, minute shelled animals have formed mountain ranges, but living, the polyps have changed the bed of many a seaway.

They take mineral matter from the sea, and they take it also from the myriads of microscopic animals with limy coverings which form part of their food; and the whole they convert into coral as hard as rock. Having studied the bee with its waxen cells, the spider and caterpillar with their webs, the molluscs with their shells, and the birds with their lime-coated eggs, we are now prepared to contemplate even these massy marvels of coral with reasoned philosophic belief.

The little animals, flower-like in appearance, grow together in countless profusion in their colonies. Instead of thinking wax, like a bee or a wasp, they think this lovely limy coral. That is only a way of putting the matter, of course, for they cannot think at all: they are very lowly organisms, in spite of the marvels they achieve.

THE ISLANDS MADE BY TINY CREATURES IN THE SEA

They work together night and day, secreting the material and building it into reefs, into islands, into barriers, into crater-like atolls. They have given us hundreds of islands on which men dwell and make their homes of the material that these minute animals have created. They alter the depths of seas by changing the levels of sea-beds. They nearly cost the lives of Captain Cook and all his crew when a piece of coral from the Great Barrier Reef off the east coast of Australia penetrated the hull of his ship, and then, by remaining fast in the hole thus caused, saved him from the wreck which must have resulted had the mass become dislodged before he gained harbor.

Age after age these great structures rise beneath warm seas. Coral polyps are born and die. They are eaten by fishes which, like sheep on the hills, browse where the polyps thrust out their bodies with waving tentacles to gather food from the water. But their work goes on, century after century, epoch after epoch. Coral polyps are growing at the bottom of the Red Sea to-day whose ancestors were at work there when Pharaoh and his host were drowned in its returning waves.

Many illustrious names are associated with the problem of coral structure. Everybody believed the substance to be sea vegetation, that the polyps were the blooms, and that the mineral, covered with a sort of skin, was the trunk of the plant or shrub.

But how were they to account for the rock-like consistency of a living shrub? "Ah," said the wise ones, "the coral is soft and flexible, like plants of the earth, till it reaches the air, then it instantly hardens into this rock-like substance."

THE GREAT BARRIER REEF WHICH IS 1,250 MILES LONG

Eventually a French scientist conducted experiments with professional coral-fishers. He made them dive and feel at the coral. They came up reporting that the under-sea coral was as hard as that out of the sea. He could not, dared not, believe it; so, slipping off his clothes, he, too, dived, groped among the coral, and found that what had been reported was true.

The amount of coral created by these puny animals is beyond human calculation. The animals are found developed sparsely in colder waters and it is in warm seas that they attain their greatest luxuriance. On some coasts they appear merely as scattered groups or mounds of coral rock, but west of the Fiji Islands is an area of coral reef 3,000 square miles in extent, and the Great Barrier Reef of Australia attains a length of 1,250 miles, all the work of these minute animals. It seems unbelievable.

Engineering so terrific as this naturally spells jeopardy to navigation, and the menace grows from age to age as the unflagging builders toil. But they have fashioned many a sweet sanctuary for ships by their atolls, many a home for man in the midst of blue and sunny seas. On and on, up and up they build.

THE TIDE-BORNE LIFE WHICH COMES TO THE NEW ISLANDS

Fish tear and rive at the coral, worms tunnel, waves break and crumble the rock, wrench off boulders of it and use these as battering rams to demolish still more. At last a fine detritus is formed to which one day a voyaging coconut comes and takes root, rises into a tree from which new nuts fall and create a grove. Birds, weary of sea flight, arrive and make their nests; tide-borne seeds and drift-carried animals reach the island.

None of us forgets that not all corals build reefs or barriers and islands. Some lovely isolated forms exist, marvelous in beauty of design, dainty as flowers in color. There are the extraordinary Star Coral, the Brain Coral, the branching *Dendrophyllia,* the massive *Astroides,* the exquisite Sea-pen, the Sea-fan, and hundreds more, an inexhaustible study in themselves.

THE HUNDREDS OF SUCKERS IN EACH FINGER OF THE STARFISH

Another important group of sea animals turn the mineral properties of sea-water to account in a different way. They have put on a lime-charged mail which is either prickly or of a gritty, leathery texture. The prickly ones give the name to the sub-kingdom. That name is *Echinoderm,* which is derived from two words meaning "spiny skin." The whole class is limbless, though the Starfish would seem to be five-limbed.

These are not legs in the ordinary way, but finger-like parts of the central body. Yet it is by their aid that it moves and gains its livelihood; not by walking, however, but by suction. Under each of those fingers are some hundreds of suckers, which, withdrawn when the starfish is at rest, can be protruded to grip the ground and pull the whole body forward. The starfish does not walk, then: it glides, following every inequality of the surface and slithering forward.

THE MIGHTY PULL WITH WHICH THE STARFISH OPENS THE OYSTER

Children have a horror of starfish, thinking that the little animals sting. We have no reason to fear them: they do not hurt us, except commercially. Molluscs should fear them—the mussels, oysters and cockles. The starfish can do what a man cannot: it can open an oyster with its fingers. Raising itself on the tips of its fingers, it grips the shells of the oyster firmly with its multitudinous suckers and pulls. The oyster is very strong, as we all know, but that steady pull wearies it. The shells are forced apart, and the starfish eats the oyster.

Enormous damage is done to shellfishes in some years by starfishes. In 1918 they attacked the shellfish beds on the east coast of England in such swarms that one small trawl alone dredged up thirty-seven tons of the five-rayed foes, but not till the latter had devoured every mussel and cockle in the channels of the low-lying areas on which they had advanced. And that followed the destruction, two years earlier, of seventy-five tons of starfish in the same area.

There is no such charge of damage to urge against the starfish's cousins, the sea-urchins and the sea-cucumbers. It is generally possible to find a Sea-urchin without going to the sea. One has only to gain access to a chalky formation and dig, and fossil urchins are practically certain to be there. These are the creatures which, in addition to a limy shell, possess the spines, like a hedgehog, which give the name to the whole group.

THE STRANGE CREATURE WHICH SHEDS ITS INSIDE WHEN FRIGHTENED

The Sea-cucumbers lack the spines, but lime enters largely into the composition of their covering. The proportion of this mineral in the sea-cucumber determines its value in countries where these animals are eaten. The sea-cucumber has the faculty of dismembering itself. A lizard can snap off its tail, a brittlestar can shiver its fingers to pieces, a lobster or a crab can shed its shell and the lining of its digestive system while preserving its soft body-form; but the sea-cucumber, if it is frightened, or angry, or unwell, can discard its entire interior—stomach, intestines, tentacles—everything, one would think, which makes life either tolerable or possible.

Away go all its physical possessions save the mere empty skin. There lies this apparently lifeless husk, for weeks, perhaps months—a husk in which the life principle alone remains, the tendency to grow and regenerate. The creature cannot eat or drink or in any visible way take nourishment. Yet, as the lobster regrows its claws, the lizard its tail, the starfish its fingers, so this lowly marvel develops new internal organs.

THE NEXT STORY OF ANIMAL LIFE IS ON PAGE 7143.

THE MORNING HYMN AT JOHANN SEBASTIAN BACH'S

7070

This picture, from a painting by T. E. Rosenthal, shows the great composer in the midst of a family group. Descendant of musicians and father of musicians, he presided over a household where music was a familiar language. For the clavichord he wrote in the scale which we use to-day.

The Nuremberg Town-band, from a wall-painting by Albrecht Dürer.

THE DEVELOPMENT OF MUSIC

II. GREAT CLASSIC COMPOSERS AND THEIR WORKS

CONTINUED FROM 6903

HOW much more interesting the history of music seems to us when we think of it as something real and vivid, taking place side by side with the history of peoples and nations! For, at the very time that the English people were struggling for the reforms that rid them of the tyranny of the Middle Ages and gave them the England we know to-day, changes in music, too, were being brought about—changes which mark the beginnings of "modern music." In 1685 despotic King Charles II died. With the end of his power the English people were ready for William and Mary to come to the throne. That marked the birth of modern England. And in the same year, 1685, were born the great and famous composers Bach and Handel. Together they may be called the fathers of modern music.

In what way did Bach and Handel transform their music into something modern? For one thing, they no longer wrote in the church modes as Palestrina had done, but used the major and minor modes, which we use to-day. They also used strong and interesting rhythms. When we hear their compositions played we do not think they sound old-fashioned and queer as we would if Palestrina's music were played.

Of the two, the greater and more influential was Johann Sebastian Bach. He came from an illustrious musical family. His father, grandfather and great-grandfather were also noted musicians; but Johann Sebastian was by far the most famous.

When Bach began composing there were three kinds of music with which he was familiar. There was Italian opera, which was written in the harmonic style, using melody supported by chords. There were the simple German folk songs. And there was complicated church music in counterpoint, like the music of Palestrina, which had parts that flowed along side by side, instead of chords. Bach combined these three kinds of music, but wrote chiefly in the contrapuntal style. Here he showed remarkable skill. Many of his pieces he wrote in accordance with strict and intricate rules; yet they still sound fresh and sparkling and not at all held down by hard-and-fast forms. His works, especially those for the organ, are noble and majestic.

Besides being composer, organist and teacher, Bach introduced a differently tuned scale, called the "tempered

scale," which made it possible to play in every key. This is the scale that we use to-day. Bach showed how practical it was by writing a series of preludes and fugues for the clavichord, an instrument something like a small piano. This series he called The Well-Tempered Clavichord.

To anyone who is not familiar with Bach the music of this great composer may sound strange and uninteresting, but that is because his style is so unlike that of most composers whose music we hear to-day. Once the strangeness wears off, there is endless enjoyment in following the parts of a Bach fugue.

George Frederick Handel, composer of great oratorios, from a picture by Hudson in the Bodleian Gallery, Oxford, England.

Handel composed somewhat in the contrapuntal style of Bach, but his music was written more to meet the popular taste. Less complicated than Bach's, it met with greater immediate success. While Bach is most famous for his organ works, Handel is known best because of his beautiful oratorios. These oratorios were written on subjects taken from the Bible, and were sung by great choruses with solo voices and orchestra. The greatest of these, The Messiah, he took only three weeks to write, working under the spell of a great inspiration. He said afterward that when he began the Hallelujah chorus he felt that "all heaven and earth were lying open to his gaze."

With the passing of Bach and Handel another change came over music. This time it was a difference in style rather than a growth of something musically new. Always it has been the habit of man to want new styles. And just as styles have changed in everything in the world, from clothes to buildings, so they have changed many times in the history of music.

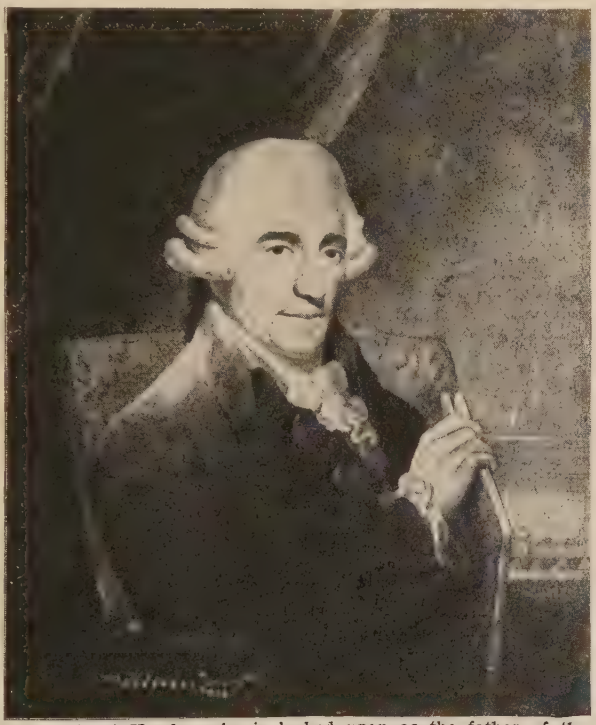
About the middle of the eighteenth century people began to feel a reaction against the ornate and intricate music of Bach. They wanted something simpler. They preferred to have their music fresh and charming like folk songs. Not only in music, but in prose, poetry and architecture, too, people felt this desire to have things simple, regular and balanced, as they were in the days of the ancient Greeks. Writers in the eighteenth century began to use the classic Greek style. Poets like Alexander Pope aimed for balanced perfection of form. The Georgian style of architecture, which became popular, imitated the symmetry of the Greek temple with its regular design of columns.

It was exactly the same with music. Bach's works had been like towering, massive Gothic cathedrals—a network of pointed arches, vaults, buttresses and stained-glass windows—as vast and irregular as a mountain. Just as it takes a long time to study the intricate details of a Gothic cathedral, so it takes a long time to study the design and ornament of a Bach fugue. But with the change in style music became like the ancient Greek temples. Everything was simple. Melodies were regular in pattern.

So simple and childlike was the style of Franz Josef Haydn that he has been affectionately called "Papa" Haydn. His compositions were never powerful, but always bright and cheerful. Aside from his works, which are still effective enough

to be played somewhat in our own times, Haydn is famous as being the father of the symphony and of the modern orchestra.

Symphonies as we know them are lengthy compositions for full orchestra, usually in four parts, or movements. A symphony is the novel or the epic poem of music. Haydn's symphonies were much shorter than those of to-day, but they were written in the same form. Usually several of the movements—most of the time the first and last—are in "sonata form." Haydn was the first composer to make something definite of this particular musical structure, which has since been used by nearly all the great composers. Its chief distinction is the use of two themes, the second in strong contrast to the first.



Franz Josef Haydn, who is looked upon as the father of the modern symphony and of the modern orchestra.

Modern symphony orchestras are much alike, and composers to-day can write for the instruments they know will be in the orchestra, but in Haydn's day each orchestra was different. He had to select what instruments he thought would go best together. The combination of instruments for which he wrote has since been enlarged, but it formed the backbone of our present symphony orchestra.

Haydn's humor sometimes crept even into his serious works. Once when he was writing a symphony he was feeling annoyed that his audiences paid so little attention to his compositions, so he decided on a joke to make them sit up and take notice. When the symphony was played it started with a quiet, dainty little tune. Suddenly, without warning, came a loud, crashing chord! The effect was startling. From that time on, the piece has always been known as the "Surprise Symphony." Haydn is remembered chiefly for his symphonies and for his string quartets (which are pieces in symphonic form for two violins, viola and cello). His oratorio The Creation is also famous.

MOZART HAILED BY MANY AS THE MOST PERFECT MUSICIAN

Following in the footsteps of Haydn, Mozart also wrote in the symphonic form, composing not only symphonies and quartets, but violin-and-piano sonatas, concertos for piano and other instruments, and quintets. He was an unusually fine musician. As a child prodigy he started to compose at the age of four; although he died at thirty-five, he wrote a large number of works.

Many musicians have considered Mozart the greatest, or at least the most perfect, of composers. Once, at a dinner given to Brahms, a toast was made to "the greatest composer," referring, of course, to Brahms. Whereupon Brahms immediately jumped up, raised his glass, and replied: "Yes—to Mozart!" Like Haydn, Mozart made his symphonies clear and flowing with melody. But there is less childlike brightness and more seriousness in them. Mozart's music was never overpowering in vigor or towering in size; but what he tried to do he did perfectly. He wrote several operas. His music for them is delightful, but the operas themselves are old-fashioned.

The man in this period who was most famous for his operas was Gluck. Before

Gluck's time opera had become little more than a concert to display the voices of the singers. But Gluck thought that it was more important for the opera to tell its story in a dramatic and exciting way than to "show off" the singers' voices. He wrote his operas with that end in view, and did much to improve opera.

A GREAT RESTLESS SURGE IN BEETHOVEN'S MUSIC

But now there emerged a great figure who took over the form and style of Haydn and Mozart and made, not dainty and simple compositions, but huge, rugged musical works of such a stormy nature that his fellow-musicians marveled and shook their heads. That man was Ludwig van Beethoven, who was born about 1770. Beethoven was a pupil of Haydn. His music at first was much like Haydn's, but before long it developed into a powerful style that "Papa" Haydn could never have reached. Beethoven put great intensity and expression into his compositions. They were still simple and direct, but it was a noble, glorified simplicity.

What was the difference between Beethoven and those who went before him? The music of Haydn and Mozart was beautiful, like a lovely hand-painted vase, but it had no personal feeling. It was not alive. Beethoven, with his strong personality, could not help putting his emotions and moods into all his music. He wrote in the same forms in which Haydn did, but filled his compositions with love, hate, anger, restlessness, the quiet of the country and the din and turmoil of war. Instead of picturing the beauty of a vase, his music was like the beauty of a rocky mountain or a dark and stormy landscape. Beethoven had humor, too. One movement in each of his symphonies he called "scherzo," or joke. The scherzo of his Fifth Symphony has a passage for double-basses—the huge stringed instruments which men play standing up—in which the music frisks around in lively fashion like the capers of playful elephants!

From childhood a favorite of royalty and nobles, Mozart is here shown as playing before members of the court of Vienna.

BEETHOVEN'S FIFTH SYMPHONY: "FATE KNOCKING AT THE DOOR"

Among Beethoven's works are nine great symphonies, the last one written not only for orchestra but for chorus as well. The most famous is the Fifth, in which the musical idea has a *rap! rap! rap! rap!* rhythm, described by Beethoven

A MOMENT OF DRAMATIC INSPIRATION

This dramatic picture suggests the rush of imagination sweeping Schubert along as he composed his thrilling song, The Erl-King.

Courtesy of Steinway & Sons.

as "Fate knocking at the door." His sixth Symphony, called the Pastoral Symphony, gives us the atmosphere of life in the country. It is the first great piece of "programme music," or music that describes some event or mood. Beethoven also wrote overtures, string quartets, and an enormous amount of piano music. One of the tragedies of his life was his deafness. However, it did not prevent his composing, because even when entirely deaf, he could still hear *in his own mind* the pieces he wrote!

About this time—the opening of the nineteenth century—a new movement, known as the romantic movement, was slowly starting among the arts. It was another change of style! People had become tired of the stiffness and lack of feeling of classic art, both in literature and in music. They wanted to use their imaginations. They wanted to express their own feelings. In literature, poems such as The Ancient Mariner stirred the people's fancies. Beethoven was partly romantic in his music because of the completeness with which he gave vent to his feelings, but the forms he used were still classic. Two other composers who were romantic in feeling but still kept to the classic structure of music were Schubert and Mendelssohn.

In this statue by Robert Weigls, Ludwig van Beethoven has a rugged, stormy and impetuous mein, reminding us of his music.

No one in the history of music has ever had a greater gift for melody than Franz Schubert. Music flowed from his pen day after day with wonderful rapidity, but he was too lazy to revise and perfect his work. The story is told of Schubert's writing his song Die Forelle late at night. When he reached for the bottle of sand, which was used then instead of a blotter, he was so sleepy that he seized the ink bottle by mistake, and before realizing what he had done, poured ink all over his manuscript. For a week or more afterward he refused to bother to rewrite it! Schubert is at his greatest as a songwriter. Even his symphonies are so brim full of melody that they seem like songs on a giant scale. His most widely known work for orchestra is his Unfinished Symphony, so called because he completed only the first two movements. Among his songs are the beautiful Hark, Hark, the Lark! and the dramatic and thrilling Erl-King.

Schubert was far removed from Beethoven's stormy compositions, but the dainty, charming and polished music of Mendelssohn differed still more widely. When quite young, Mendelssohn showed great talent for composing. At seventeen he wrote his Midsummer Night's Dream Overture, a beautiful and delicate work for orchestra. Besides other overtures he wrote symphonies and piano pieces and an important oratorio, Elijah. Mendelssohn was strongly impressed by a visit to Scotland, and much of his music contains Scotch atmosphere.

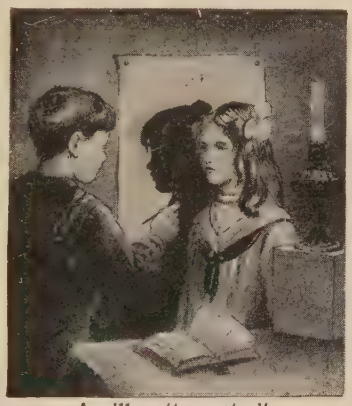
So Schubert and Mendelssohn, while keeping to the patterns used by the classic composers, gave music new feeling, new moods. But for the real and wholehearted beginning of the romantic movement in music we must turn to Robert Schumann, whose expression was more free and fanciful. He was not only a great musician but a great critic.

THE NEXT STORY OF THE FINE ARTS IS ON PAGE 7149.

MAKING AN OUTLINE PORTRAIT

CONTINUED FROM 6964

IN the days of long ago, before photography was invented, our grandfathers and grandmothers used to have portraits of themselves taken sideways. They were what were known as silhouette portraits, and they were not taken with a camera, but were cut out of thin black paper, and stuck upon a white card. The word *silhouette* comes from the name of Monsieur Etienne de Silhouette, a French Minister of Finance in 1759, who was thought to be very grasping, and it was given to this kind of portrait because it consists of the mere outline, and is quite mean, or meagre, in detail. Until a few years ago men might often have been seen in the streets of Boston and other big cities who, for a penny, would cut out a silhouette portrait of anyone who cared to stand before them for a few minutes. These portraits were about the size of a visiting card and were often very good likenesses. Of course, these portraits were more or less accurate as side views of the face, according to the skill of the man who cut them out. If he had much artistic ability they were good likenesses; if not, they were sometimes very poor.



A silhouette portrait.

In still earlier days, when silhouette portraits were fashionable and popular, they used to be done in a more scientific way. The person whose portrait was to be taken sat sideways before a screen, with a light on a table on the other side of him, and in this way a clear shadow was thrown upon the screen, which gave a perfect portrait if the light and sitter were arranged properly.

Then the outline would be traced upon the screen, and from this it was, by mechanical means, transferred, on a small scale, to a sheet of special black paper, cut out, and mounted on card. Many of these old silhouette portraits have come down to us. There is a famous one of Edward Gibbon, the historian, which gives not only his face, but his whole figure, and he considered it the best of all the portraits of himself that had ever been drawn. There is also a famous silhouette portrait of Robert Burns, the Scottish poet.

With a little care we can make silhouette portraits of our friends. It is not necessary to have an elaborate screen such as the old silhouette portrait-makers used; all we need do is to fasten a sheet of paper on a flat wall, put the sitter near it, with a good light of some kind on a table, placed in such a way as to throw a shadow of our friend upon the paper. Then, with a pencil, we draw carefully round the outline of the shadow, and afterward cut it out. We may use paper that is black on one side and white on the other, drawing the outline of the face on the white side, and sticking the portrait down with the black side up. Or we may draw the shadow-portrait on white paper, cut it out, and then, using it as a pattern, make a copy in black paper. The picture on this page shows how a person should sit to have his portrait taken in silhouette, and at the top of the page are some specimen silhouette portraits. The sitter should, of course, sit perfectly still while the outline of the shadow is being drawn, and if necessary the head may be supported in some way so that the shadow may remain perfectly still. A movement will blur the outline.

Silhouette portraits must show the face sideways, as a front view would give nothing at all distinctive to indicate the features of the person represented; whereas, when the nose and chin are seen, we have the likeness of a person. In arranging the light we should be careful to place it well back on the table, so that there may be no chance of it being knocked over.

ROBIN HOOD AND HIS MERRY MEN

A LITTLE PLAY FOR THE SCHOOLROOM

THIS play can be acted in a garden. If acted out of doors, instead of having the curtain lowered, the actors disappear among the trees.

COSTUMES

Robin Hood, Allan-a-dale, and Little John all wear peaked hats with quills, green or brown tunics, and long stockings with pointed shoes, each carrying bow and arrows, and Robin Hood wearing a horn and sword; Friar Tuck, in a monk's habit; Maid Marian, in a short dress with hanging sleeves, and Rosamund, in a close-fitting gown with hanging sleeves; Simon, in a long, loose gown trimmed with fur, and a low, soft hat, and carrying money-bags.

CHARACTERS

ROBIN HOOD. LITTLE JOHN. FRIAR TUCK. ALLAN-A-DALE. MAID MARIAN. SIMON OF LINCOLN. ROSAMUND (Simon's step-daughter).

Scene: The Forest of Sherwood. Wrapped in cloaks, Friar Tuck and Little John, his hat, bow and arrows beside him, are lying asleep under a tree. Allan-a-dale is keeping watch.

ALLAN: The sun is up. Hey, there! Awake, my merry comrades.

Pokes them with his bow.

FRIAR: Good-night!

sleepily

ALLAN: Wake, rouse thyself; 'tis late! Good-night, forsooth; and thou hast slept without stirring, the last four hours!

Pokes him with his foot. Friar Tuck gets up and rubs his eyes, yawning. Allan pokes Little John, who leaps to his feet and seizes Allan by his throat.

JOHN: Ha, varlet! I've got thee.

ALLAN: Thou'rt a pretty fellow to rouse! Dost take me for an assassin?

JOHN: 'Twas an evil dream I had. Thy

laughing pardon, comrade. Ha, here comes our liege lady, Maid Marian!

Enter Maid Marian through the trees at back. Little John puts his arrows on his back.

MAID: Good-morrow, friends! Now let us

smiling make ready the breakfast.

ALLAN: There yet remains some of the haunch of venison, lady.

MAID: Bring it hither!

Allan goes out among bushes on left. Little John and Friar Tuck clear leaves from ground at foot of tree.

FRIAR: There, 'tis well!

JOHN: And here comes the breakfast.

Allan comes back with meat on a wooden platter, wine in a horn cup, and bread. He puts them on the ground. Singing heard in distance.

MAID: Listen! 'Tis Robin Hood.

Robin Hood comes in from the back, and presents some wild flowers to Maid Marian.

ROBIN: All hail, my merry men! Come, let's eat! I'm as hungry as a wolf.

They sit down and eat. How did you sleep after last night's carouse?

FRIAR: I slept soundly, for one.

ALLAN: Ay, indeed! I could scarce rouse him.

ROBIN: 'Tis well you are rested. I have fine sport for you to-day.

JOHN: Sport?

ROBIN: Yes. 'Tis a rich merchant, Simon of Lincoln, who is traveling through the forest with his step-daughter. Report says he has great riches.

MAID: We'll relieve him of them. 'Tis not just that one man should be burdened with so much gold.

JOHN: Yes, indeed! We will share the burden among ourselves. When comes he, master?

ROBIN: He should be here anon. Now list to me, and I will tell you my plan. This Simon may not be as miserly as reported, so we will give him a chance. I will disguise myself as a beggar. If he gives me alms, he shall go unmolested; but if not, then I fear he will leave us a wiser and a very much poorer man.

JOHN: Hist! What is that?

ROBIN: There they come! Hide, all of you!

standing up — All hide but Robin Hood, who, wrapped in a cloak, sits under tree. Simon and Rosamund enter on the right.

ROBIN: Will my lord give a poor man some money?

holding his hand out

SIMON: No! Dost think I have money to give to every idle beggar that besets my path?

ROSAMUND: Nay; I beseech you give the poor man something. I would, and gladly, if I had it.

SIMON: Silence! To Robin: Out of my way, thou wicked knave!

ROBIN: Not so fast, Simon of Lincoln, not so fast! Rises and throws off cloak and hat. So I am a wicked knave, am I? Others come out of hiding. Here be three more—stout, lusty fellows, too.

SIMON: Thieves, as I live!

Tries to run away. Friar and Allan-a-dale seize him. Rosamund looks terrified.

MAID: Fear not, pretty maid. No harm shall befall thee.

ROBIN: Hand over thy riches, friend Simon.

SIMON: Oh, don't take my money—my dear money, my precious gold! Anything but my gold. Take Rosamund. Only leave me my riches!

Clutches at money-bags, which Little John takes.

ROBIN: Shame on thee, coward! Wouldst barter thy step-daughter for thy miserable gold? We will take it from thee, and give it to her. Thou canst thank thy stars that thou hast gotten off so cheaply. Now go! Simon goes out on left. Maiden, thou hast a starved and ill-used look. Is thy step-father cruel to thee?

Gives her money.

ROSAMUND: I—I—cannot— Weeps.

MAID: Nay, cry not! I see thou art too loyal to betray thy step-father. Come, he shall not harm thee more.

ROBIN: We will conduct thee to kinder friends.

ROSAMUND: But I have no other friends. Oh, let me stay here with you!

ROBIN: Right willingly! What say you, Marian?

MAID: The more the merrier!

Kisses Rosamund.

ROBIN: Come, comrades, let us welcome her with dance and song.

They dance and sing merrily as the curtain falls, or as they disappear here and there among the trees.

THE RIGHT WAY TO DO SIMPLE THINGS

THERE is a right and a wrong way of doing everything, and it will help us in carrying out some of the simplest tasks of everyday life if we know how to set about the work in the best way. These are some hints as to the right way of doing some simple things:

TO HAMMER IN NAILS

When we are hammering nails into wood, it is a mistake to hold the hammer tightly near the head. The nail must be steadied in place with the thumb and first two fingers of the left hand across the grain of the wood, while a gentle, free tap or two are given, followed by harder and harder blows, and, as the nail gets a firm hold, it is released by the left hand and driven home.

TO COVER A BOOK WITH PAPER

The best material for covering a book is fairly thick brown paper, but sometimes glazed lining is used, and it lasts well.

When covering with paper we lay the book open in it, leaving a margin of about two inches round it, then fold this margin in over the two leaves of the cover. Next we take a pair of scissors, and cut the paper margin at the top in two places slantwise toward what we may call the backbone of the book, repeat this at the bottom, and turn the two little flaps so formed between the binding and the paper cover. Now the margin stands out in two pieces above and two pieces below, so we take the corners of the parts folded over and tuck them down behind the back, between the binding and paper cover, as far as they will go and fold over the four outstanding flaps.

TO MAKE BUTTONHOLES

When making buttonholes on thin material baste a piece of India linen or muslin underneath where the buttonholes are to be. Then cut the buttonhole through both materials, and work. When finished, cut away the piece of goods underneath close to the work, and the result is a firm buttonhole.

TO REMOVE A GLASS STOPPER

When a glass stopper refuses to come out of a bottle, we must first give a few regular steady taps downward, round the neck of the bottle. If this method fails, we may try clasping it in our warm hands, or wrapping the neck round with a rag dipped in hot water. One of these methods will generally release the most stubborn stopper.

TO DRY AN UMBRELLA

When we come in out of the rain, we must dry our umbrella by opening it and placing it, handle downward, in a current of air, which will quickly dry the silk cover; but at the same time we must be careful to select a spot where the dripping water can do no harm. If we place our umbrella in the stand without drying it, the water will in turn rust the ribs and rot the cover at the end of the stick. We must always remember never to roll up our umbrella when it is at all damp, otherwise the silk will very soon get cut and wear out.

AMUSEMENT WITH STOPS AND COMMAS

THE little commas and periods, and other similar signs that we see scattered about this page, and the pages of all the books that we read, do not seem very important. Yet, without these, it would very often be quite impossible for us to know what a writer meant.

Some sentences and paragraphs, indeed, can be made to have two exactly opposite meanings, according to how the stops are put in, and a good deal of amusement can be had if a few friends sit round a table, each having before him a paper and pencil, and try to punctuate correctly some of these rather difficult sentences.

SENTENCES THAT NEED STOPS

Here is a very startling statement:

King Charles I walked and talked half an hour after his head was cut off.

We might doubt the accuracy of this, but when we know that there should be a semicolon after *talked*, and a comma following the word *after*, then the meaning is quite plain:

King Charles I walked and talked; half an hour after, his head was cut off.

Many of us know the little rhyme:

Every lady in this land
Has twenty nails upon each hand
Five and twenty on hands and feet
All this is true without deceit.

We wonder how it can be true, till it is properly punctuated in this way:

Every lady in this land
Has twenty nails; upon each hand
Five, and twenty on hands and feet.
All this is true without deceit.

Here is a sentence that looks like a mere jumble of words:

That that that is is that that is not is not that that that that is not is not that that is is is not that so.

It should be punctuated in this way, and the words in italics should be emphasized:

That *that* that is, is *that* that is not, is not; that *that* that is not, is not *that* that is, is. Is not that so?

THE INSPECTOR AND THE MAYOR

A Prussian school-inspector called one day upon the burgomaster, or mayor, of a small town, and asked him to come on a tour of inspection of the schools in the district. The burgomaster was not anxious to go, and the inspector heard him mutter to himself: "What is this donkey here for again?" At the first school, the inspector said he would like to examine the children in punctuation. "Oh, bother that!" said the burgomaster, anxious to get on to the next school. "What do commas and such trifles matter?" But the inspector insisted, and, writing a sentence on the board, he asked a boy to read it, which the lad did as follows: "The burgomaster says the inspector is a donkey." Then, putting commas after the words *burgomaster* and *inspector*, he asked another boy to read the sentence, thus: "The burgomaster, says the inspector, is a donkey."

In this rhyme, to make sense, a semicolon should be placed after the first noun in every line except the last of each stanza.

I saw a peacock with a fiery tail
I saw a blazing comet pouring down hail
I saw a cloud all wrapt with ivy round
I saw a lofty oak creeping on the ground
I saw a beetle swallowing up a whale
I saw a foaming sea brimful of ale
I saw a pewter cup sixteen feet deep
I saw a well full of men's tears that weep
I saw wet eyes in flames of living fire
I saw a house as high as the moon and higher
I saw the glorious sun at deep midnight
I saw the man who saw this wondrous sight.

I saw a pack of cards gnawing a bone
I saw a dog seated on Britain's throne
I saw King Edward shut up in a box
I saw an orange driving a fat ox
I saw a butcher not a fortnight old
I saw a great coat all of solid gold
I saw two buttons telling of their dreams
I saw my friends who wished I'd quit these themes.

Some years ago a London news agency received a cablegram from its correspondent in Australia which read as follows:

"Influenza extensively prevalent Wales Victoria numerous deaths Bishop Adelaide found dead sea-serpent sixty feet Coffin Bay."

This was published in the newspapers as three separate items of news to the effect that influenza was very prevalent in New South Wales and Victoria; that the Bishop of Adelaide had been found dead; and that a great sea-serpent, sixty feet in length, had been seen in Coffin Bay.

As a matter of fact the bishop was not dead, and it was he who was supposed to have found the remains of a dead sea-serpent lying on the beach at Coffin Bay sixty feet long.

STOPS THAT COST MONEY

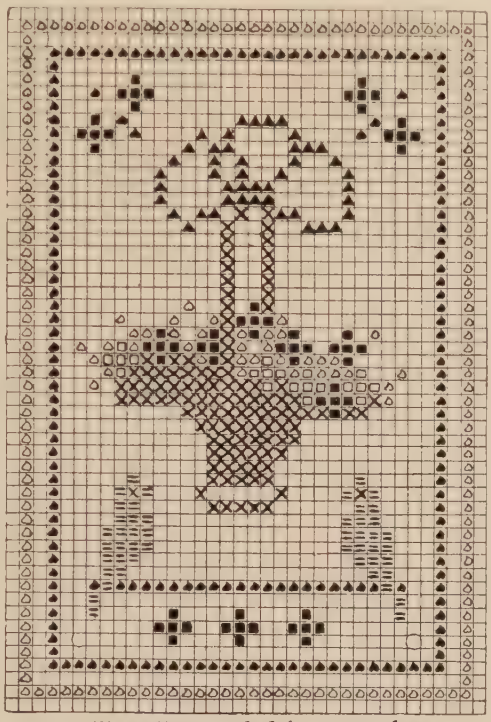
Some years ago, the blunder of an American clerk, in putting a comma in the place of a hyphen, cost the United States nearly $2,500,000. A duty was to be put on certain goods going into the country, and among those to be allowed in free were "all foreign fruit-plants," meaning young fruit-trees for planting. In copying this part of the Bill for Congress, the clerk made it read: "all foreign fruit, plants," and so on. The result was that for a year, until Congress could set the mistake right, all kinds of fruit were allowed into the United States free of duty.

A wealthy Frenchman left a large sum of money to his two nephews. Each expected *two* hundred thousand francs, but the executors said they were entitled to only *one* hundred thousand. The nephews pointed to a sentence in the will which read like this: "A chacun deux cent mille francs," meaning, "To each two hundred thousand francs"; but the executors pointed to a small apostrophe between the *d* and the *eux* of deux, making the sentence read: "A chacun d'eux cent mille francs," which means, "To each of them a hundred thousand francs." The nephews, however, got two hundred thousand francs each, the court deciding that the mark was a smudge.

A LITTLE PICTURE ON CANVAS

THOSE of us who have a grandmother have most likely seen the "sampler" which she did when she was a little girl. It is years and years old, and it hangs on the wall in a picture-frame. It has her name on it and the date, and some queer birds and animals, possibly some trees in pots, and some sprigs of flowers. Round it all is a border, and the whole picture is worked in wool on canvas. Now we are going to learn how to do a small sampler or canvas picture for ourselves—much smaller than grandmother's, but quite large enough for us to begin with.

When finished, it will be about the size of a postcard, and the picture on it is made up of a basket of forget-me-nots, tied with a bow, while underneath are perched two little yellow birds. As many shops sell little black or dark brown frames in postcard sizes very cheap, we shall be able to get our canvas picture framed at no great expense. In fact, it would make a nice little present for someone going away, with its very appropriate message of "Forget-me-not" suggested by the flowers. Now to begin. We shall need very few materials—just ¼ yard of double-thread canvas, some colored wool, and a canvas needle. The wool can be obtained at almost all the fancy-work shops, and the needles are like darners with blunted points. The colors of wool used are two shades of green, two shades of blue, one pink, one yellow, one brown, and one deep cream for the background. Pretty soft shades should always be chosen, and they must, of course, harmonize. In picture 1, which shows us the design from which we are to copy our pattern, each square represents, in the actual work, a cross, and the whole picture can be copied in this way—that is, by making a cross on the canvas for each square in the position shown in the design. The stitches must completely hide the canvas. In picture 2 we see how a cross-stitch is made. We are going to copy the whole of our picture from the design, and afterward fill in the background with another color.

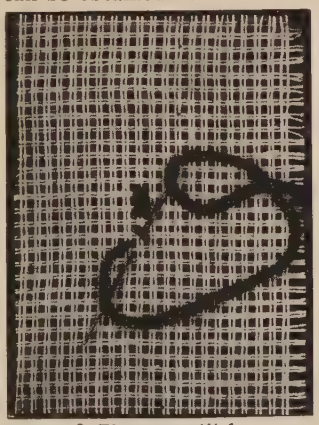


1. The pattern, worked in seven colors.

Picture 1 gives us the pattern from which to work; this is the "key" to it:

Dark green	—filled-in leaf.
Light green	—outlined leaf.
Dark blue	—filled-in square.
Light blue	—outlined square.
Brown	—cross.
Yellow	—two lines.
Pink	—triangle.
Cream	—not shown.

The cream for the background is not shown, as all the empty squares left when our pattern is finished are to be filled in in this color last of all. We fold the quarter yard of canvas into three pieces, and cut off one piece, which will be a square of about 9 inches. We must turn the edge in ½ inch all around, and tack it down with white cotton. This is done, of course, to prevent the canvas from fraying out, and also to prevent our wool from catching in the rough edges. Now we have to find the centre of the square. If we feel we cannot guess it near enough, the best way will be to double the canvas diagonally—from corner to corner—crease it, and then unfold it, and do the same from the other two corners. Where the creases cross will be the centre, or, at any rate, it will be quite near enough, as our canvas will leave plenty of margin.



2. The cross-stitch.

3. The sampler.

The best way to begin to work our sampler is to start the centre of our picture in the centre of our canvas. If we look care-

fully, we shall see that the forget-me-not which comes under the handle of the basket is nearly in the centre. So we will choose this to begin with, and make it of blue wool in five crosses. Now we take a thread of green wool and make a cross on the right of the outside petal of the forget-me-not, then one cross immediately below the last, and then one to the left of that, and one again below. The next cross is below the last, but one square to the left of it; then we make another below, but one square to the left, and then three crosses upward, which brings us to the forget-me-not again. We take the blue wool again and make the forget-me-not which comes under the first one, but one square to the right of it. Here are two flowers close together; we make one a light blue and one a darker blue, and then proceed with the green leaves in a similar fashion, just counting the squares. The handle of the basket is worked in brown, starting from the right of our first forget-me-not. The basket comes next, as shown in picture 1. At the bottom of the basket a row of five squares is left to show the rim. These are to be filled in when the background is made. We work the bow in pink, and from this we can easily count to the corner sprays, which are worked in blue and green. For the bar on which the birds are seated we can start from the centre and work outward—five squares down from the bottom of the basket, and twenty-four for the bar. Next, we work the two birds, and, last of all, the two borders. The birds' eyes should be worked in brown. The birds are made in canary-yellow, and the bar in green. The borders also in green, of two shades. We must not forget the three blue flowers below the bar. Picture 3 shows the sampler finished, except for the filling-in of the background. When the background has been filled in with cream-colored wool, we press the picture on the wrong side with a warm iron. This makes the wool work stand out in relief.

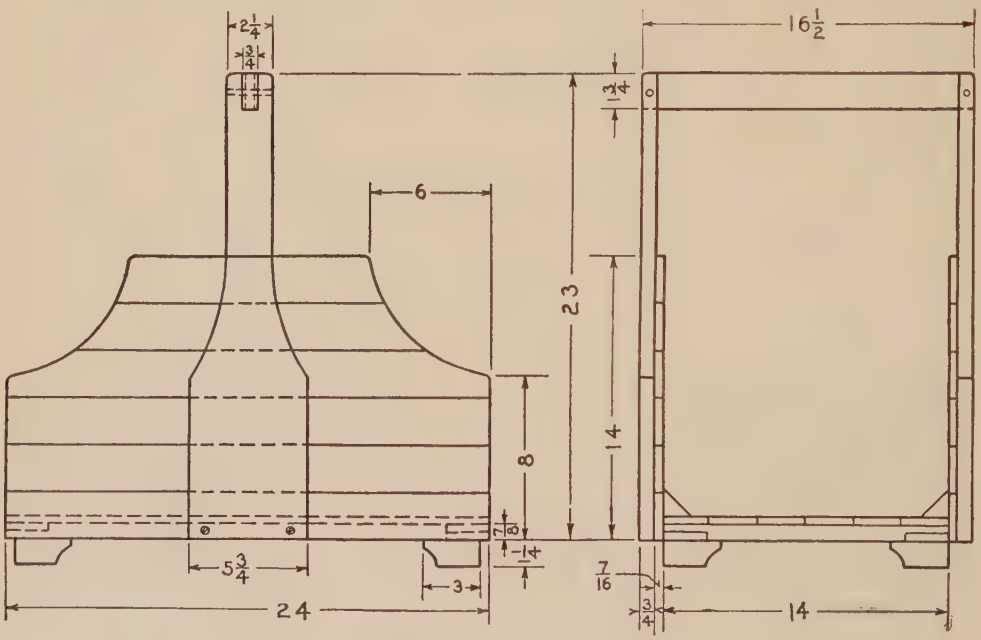
MAKE THIS ATTRACTIVE WOOD-BASKET

IF you have need in your house for a wood-basket you will be interested in the attractive one shown here. The material specified in the working drawing may be selected from odds and ends about the house.

The construction is quite simple. The rectangular frame at the bottom has end-lap joints, while on the bottom and sides ½ inch by 3 inches matched material is used. Any thin tongue-and-groove material might be satisfactorily used, but matched wood is not necessary. The vertical supports for the handle are fastened to the frame with screws, and the handle is joined to the supports by forked joints, which should be further secured at either end by a dowel or screw.

When stained a dark color, this basket is quite appropriate as a piece of fireplace furniture. The simple design makes its construction easily possible for anyone with a fair knowledge of wood-working tools.

In use this wood-basket has proved most satisfactory. However, you may modify this design to suit any purpose if you should decide that such a change would improve its appearance and usefulness.



Working drawing of wood-basket.

SIMPLE EXPERIMENTS WITH AIR AND WATER

WE can learn a great deal of science from the most familiar objects in our homes, and an interesting half-hour may be spent in performing simple experiments that will teach us much that we ought to know. The following tricks and experiments can all be performed without buying any special apparatus.

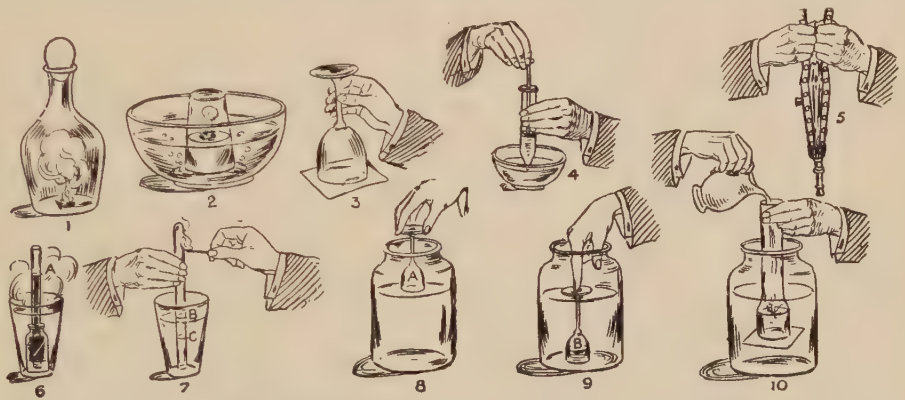
First of all, we can perform an experiment that will show us how the air, that is invisible and does not seem to have any weight, is actually pressing down upon us and upon everything on the earth's surface. We take a wide-necked bottle such, for example, as the water-bottle in our bedroom, to help us in our experiment, and we also prepare a hard-boiled egg by carefully removing all the shell.

Now we put into the bottle a piece of lighted paper, and, after a second or two, place the egg in the neck of the bottle as though it were the stopper. The egg will, of course, remain there just as if it were in an egg-cup. At least, that is what some of us would expect. But if we watch the hard-boiled egg we shall see, after a time, that it is gradually going down the neck of the bottle as though it were being sucked in. Then, suddenly, it will enter the bottle with a loud noise. What is the explanation of this? It is very simple. The burning paper heated and expanded the air in the bottle, and some of it was driven out through the opening at the neck. Then the egg was placed in the neck and the opening was stopped up. Presently the air in the bottle cooled, and, as it lost its heat, it contracted, or filled less space, so that there was a partial vacuum in the bottle, and the air outside pressing upon the egg drove it into the bottle.

There is another simple experiment which shows clearly the pressure of the atmosphere. Take a basin of water, and on the surface of the water let a cork float. Now place on the cork a piece of lighted paper, and over these invert an empty glass, pressing it down gently into the water. Bubbles will be seen to come from under the glass. This is the air being driven out owing to the fact that the heat from the lighted paper has expanded the air, and the glass will not hold it all. A few moments after the water is seen to rise in the tumbler.

Still another experiment will prove that the air exercises a pressure, not only downward, but upward as well. We take a wineglass and fill it carefully up to the brim with water. Then we take a thin sheet of paper, and place it on top, so that it touches both the surface of the water and the rim of the glass. Now, holding the paper carefully in position, we turn the glass of water upside down, and the water will remain in the glass apparently suspended.

If we should like another experiment to prove the downward pressure of the air, we can use our basin of water again, and take a small ear-syringe such as is found in every house. We fill it with water and invert it, with the point in the water in the basin. Now we press down the rod and empty the syringe. As soon as we pull up the rod again the water rushes up and fills the syringe. The reason of this is that the pressure of the air all over the surface of the water in the basin drives the water up into the syringe.



Easy experiments that can be made in every home.

An interesting experiment, this time with a pair of ordinary fire bellows, proves that the pressure of the atmosphere is exerted, not only above and below, but sideways and in all directions. Having blown all the air out, we completely stop up the nozzle and the vent-hole with corks, and then, if the bellows are in proper order and are air-tight, no one will be able to open them, no matter in what position they may be held. The air outside pressing equally on all sides holds the bellows together.

All bodies, solids, liquids and gases alike, when heated expand—that is, fill more space—and two simple experiments will show this clearly in the case of liquids and gases. We take a small bottle, fill it with some colored liquid, such as water in which a little glycothymoline has been dropped, and cork it up. But we must see that the cork is pierced, and a piece of glass tube, open at both ends, inserted. Now, if we plunge the bottle into a vessel of warm water, as seen in picture 6, the colored liquid will be seen to rise in the tube to *A*.

In order to show that gases also expand we must use a glass tube closed at one end. We

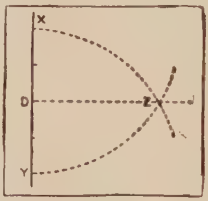
take the tube, which is, of course, full of the gas that we call air, and put it into a tumbler of water, as shown in picture 7. The water rises to a certain point, *B*. Now we hold a lighted taper to the upper part of the glass tube, and, after an interval of a second or two, the water slowly descends in the tube from *B* to *C*.

Another experiment with a wineglass and a jar of water will show that gases, such as the atmosphere, possess the property of compressibility—that is, they can be pressed into smaller space. We take the wineglass and invert it on the surface of the water. The glass is full of air, which occupies the whole of the space *A* in picture 8. Now we press the glass down to the bottom of the jar, and we see, as in picture 9, that some water has risen in the glass, and the air that formerly occupied the whole glass now fills only the space *B*, and as none has escaped, this proves that air can be compressed.

There is a simple experiment to show that liquids, like gases, exert a pressure equal in all directions. Take a common glass lamp chimney and place below the wider opening a piece of cardboard. Hold this against it and plunge the whole into a jar of cold water. Now remove the hand that held the cardboard, and it will be found to remain in position, the upward pressure of the water holding it against the glass. Now pour water gently into the lamp chimney above; it will be seen that the card continues in position until the water in the glass reaches the level of the water outside the chimney.

HOW TO MEASURE A STREAM

IT used to be thought that only a man who had served a long apprenticeship could do land surveying; but this is far from being the case, and any intelligent boy who cares to take a little trouble can find a great deal of interest and pleasure in measuring distances and heights, and even mapping out a stretch of country. What might seem one of the most difficult things to do—measuring the width of a wide river—is really quite simple, and will provide a very interesting occupation for Boy Scouts and others who like to get profit for the mind as well as pleasure for the body from a walk in the country.



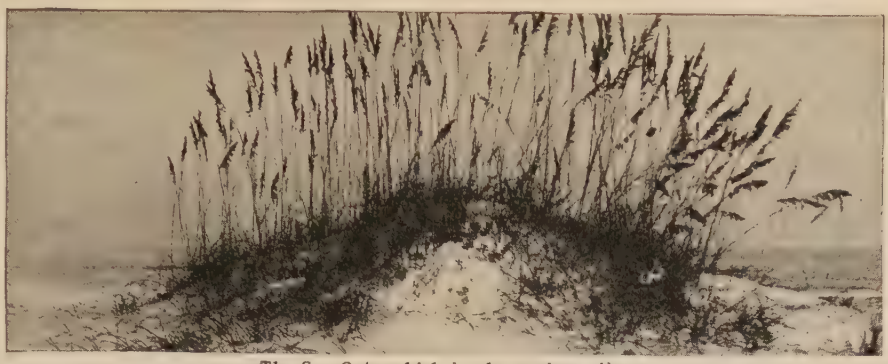
Making the angle.

The science of land surveying is a very ancient and honorable one, for it is supposed that it originated in Egypt, where it was necessary accurately each year to set up again the land boundaries washed away by the flooding of the Nile.

To measure the width of a stream we first of all choose a place where both banks are at about the same level and the stream is fairly straight. Then we select some tree or bush or stone, or other fixed object on the opposite bank, quite close to the edge, such as *A* in the picture. On our own side of the stream we mark off a straight line at right angles to the stream as at *BC*, in continuation of a straight line from *A* to *B*. This is done by placing a stick in the ground at *B* immediately opposite to *A*, and in moving back to *C*, taking care to keep the stick always exactly in front of the bush at *A*. We can mark the straight line *BC* by laying a string on the ground, if we have one, or by putting stones at short intervals.

An easy way to measure the width of a river.

Now from some point, such as *D*, not far from *B*, we mark a line *DE* at right angles to *BC*. To get the line exactly at right angles we proceed as shown in the smaller diagram on this page. We measure off, say, two feet on either side of *D* in the line *BC*. This gives us the points *X* and *Y*. Then we take a stick—a fairly straight branch of a tree will do very well—and holding one end at *X*, which we use as a centre, we describe an arc of a circle. Now putting the end of the stick at *Y*, we again describe an arc, and the point *Z* is where the arcs cut one another. At this point *Z* we place a stick in the ground, and another stick at *D*, and then moving along so that in our vision we always keep one stick exactly in front of the other, we are able to mark the line *DE* as we did the line *BC*. *DE* should be measured to about 30 feet, and we should mark the point *F* at two-thirds the distance, that is, at 20 feet, and put a stick in the ground. Now from *E* we mark another line at right angles to *DE*, and we continue this till we come to a point *G*, where, looking across to our landmark on the other side of the stream—the bush at *A*—we see the stick at *F* exactly in front of it. Now, with practically no trouble at all, we can find the width of the river, for we have only to work a simple proportion problem. As the line *EF* is to *FD* so is *EG* to *DA*. *FD* is 20 feet, *EF* is 10 feet, and we will suppose that *EG* is 8 feet. Then our problem stands like this: As 10 : 20 :: 8 : *DA* = 16 feet. From this figure we must deduct the distance *BD*, which we find, by measuring, is, say, 3 feet, and we have 13 feet as the width of the stream. Measuring roads, fields or rivers is fascinating.



The Sea Oats which is always in motion.

FLOWERS OF NORTH AMERICA

WILD FLOWERS OF THE SOUTH

CONTINUED FROM 6940

WHENEVER an American speaks of the "South," he really means the southeastern quarter of the United States. The great states of Texas, Arizona and California, while in the southern half of the country are, with the exception of Texas, never thought of as belonging to the South. They belong more to the West. So it will be the story of the wonderful wild flowers of the southeastern states which I shall tell—not the whole story, for that alone, were it all known, would fill a large house full of books. We can here tell of only a few things that grow in the Gardens of God down South.

One more word before taking up the wild flowers one by one. Down South there are all sorts of places in which different kinds of plants are found growing. There are mountain-tops where it is cold and the snows of winter lie deep, as in the North, and lowlands near the Atlantic Ocean and the Gulf of Mexico where the plants know little or nothing of Master Jack Frost. There are great dark swamps where the large wild flowers never look into the face of the sun, and open areas of white sand where the flowers are small so that the sun cannot burn them up. And there are great level stretches of dark wet land called "savannahs," upon which Nature grows one of the greatest wild-flower gardens in all America, and many, many other places equal in interest, all bearing their peculiar and distinctive types of plant life.

No matter what the northern children may think about it, it must be stated that there are many more different kinds of wild flowers, take it all in all, down South than there are up North. There is one thing, however, that will be of interest to all northern children, and that is that in the South the wild flowers do not come up with a rush in the spring as they do in the North. The southern boy and girl does not know, except in the mountains, what it is to see the woods bright with anemone, spring beauty, hepatica and white trillium. However, if our boy and girl in Dixieland should live near a savannah, they have the joy of watching a perfect procession of loveliness all summer long, or until late in November, when the dark blue savannah asters put on the last scene of the wild-flower show.

Darwin once wrote that the little plant of the eastern Carolinas which

catches insects by snapping its leaves shut upon them was the "most wonderful plant in the world." Of course all plant life is so wonderful that it is really a little risky to pick out one that is more wonderful than all of the rest. Yet if you could put your finger into the middle of the trap-like leaf of this remarkable plant and let it snap shut, though it would not hurt you, it would seem very uncanny. You would, perhaps, agree that this little plant with its almost human method of catching animals, chiefly insects, for food was more remarkable than all of the rest.

One day a carpenter was working in the writer's office, where there were a number of fly-trap plants. Without being told what they were, he was told to put his finger into the middle of one of the widely flaring "traps" to feel the surface of the leaf. When that weak little leaf closed on him, he jumped as though a bear might have bitten his finger, so surprised was he.

If one is to see these peculiar plants growing wild, he must go to the region about Wilmington, North Carolina, for these plants occur in numbers only within a radius of seventy-five miles of that city. And then when one goes into that district he must, to find them, look in a special kind of place. The plants grow only in wet, black sandy soil which is poorly drained.

SOME STRANGE THINGS ABOUT A STRANGE PLANT

The leaves are all attached to a common short little stem which is buried in the ground. The bases of the leaves, thus, after meeting at the centre of the cluster, turn down and meet an inch or so below the surface. This is an adaptation against fire, for very frequently in the winter fire sweeps over the areas, after which new leaves come up from the buried stem the following spring.

The outer part of the leaf is modified into the famous trap. Like other traps, this one has a trigger, or triggers, for there are, projecting from the centre of each half, three delicate tiny hairs, which, when touched by a wandering insect or spider, set the trap off, the halves snapping shut and pressing the unfortunate victim tightly. During the next day or two the trap-sides digest the soft parts of the body and absorb this food for the use of the whole plant.

To tell just how this wonderful leaf-trap works would take more space than we have to give. It is enough to say that the plant uses water pressure to hold the leaf open, which, when released, alters the natural spring in it to snap it shut.

The flowers of the Venus's fly-trap are modest white ones, each with five delicate petals borne in a cluster. There are no peculiar features about them; a dozen spring flowers are easily their equal. A plant with such a lovely innocent-looking flower is all the more remarkable to possess in its leaves such terrible traps lying in wait for the unwary insect. It is truly one of the most wonderful plants in the world.

THE PINE LANDS GENTIAN, WHICH BLOOMS LATE IN THE SEASON

From September to November, after the very hot days are over in the coastal plain, there comes forth here and there in the open pine woods one of the most beautiful wild flowers in America, the Pine Lands Gentian. Coming up from a slender underground stem, a rather delicate stalk develops through the summer, bearing narrow leaves placed opposite to each other. This stalk in the fall blossoms forth at the top into one lovely morning-glory-like flower. In this flower, however, the petals extend beyond the funnel part, and between the petals there also extends a fringed structure which the botanist calls "corolla-plaits," because at first this part of the corolla is folded like plaits in a dress.

The flowers frequently are over two inches long; as they wave about in the wind at the top of the slender stems they may be seen a long distance off. Within the corolla throat one finds a sprinkling of delicate brown spots which add much to the beauty of the flower when seen near at hand. It is very fine indeed for the children along the Atlantic border south of New Jersey to have such a wonderful wild flower to accompany the asters in the display which ends the great wild-flower procession of the year.

THE LIZARD'S-TAIL, WHICH HAS NO PETALS

Not everything in swamps is dark and gloomy. In the darkest places there is always something to relieve, partially at least, the solemn aspect—something which will "brighten the corner," even though it be a heavily shadowed one.

FLOWERS WELL WORTH FINDING

The High-mountain Turtlehead is rose-purple in color and about an inch long. It grows on the Appalachians.

The Pine Lands Gentian has a flower which is frequently over two inches long, and may be seen a long distance off.

The White-bracted Sedge grows in clumps on the savannahs. The flower inside the bracts is very small and inconspicuous.

The Venus's Fly-trap showing the capture of a grasshopper to supply nourishment. This plant, as you know, eats animal matter.

It is certainly the business of the Lizard's-tail plant to chase Mr. Gloom out of the swamps. Standing from two to three feet out of the water, these plants bear aloft five wonderful white racemes (slender clusters of flowers), appearing like torch-bearers. The tip of these torch flames, however, do what flame cannot do, that is, bend over and point downward. Every raceme—and this is one of the most characteristic things about lizard's-tail flower-clusters—bends over at the end, the tip thus weakly nodding and dangling about in the easy-going breezes of the sheltered swamps.

If one looks closely at the white inflorescence, he will observe a remarkable thing about the tiny individual flowers. He will find that they have no sepals and no petals; only the stamens (pollen-bearing parts) and carpels (seed-bearing parts) are present. Scientists now believe that the ancestors of this plant had sepals and petals like most flowers, but in the evolution of this flower these were lost. It is interesting to note that the remainder of the inflorescence, including the stem and flower-stalks, becomes white, so that a very showy structure still is present to guide the insect to the little flowers for purposes of pollination.

THE WHITE-BRACTED SEDGE, IN WHICH THE FLOWERS ARE TINY

Everyone, I suppose, knows that the brilliant poinsettia, with its glowing red, owes its special beauty, not to the flowers at all, but to the upper leaves, or bracts, which, contrary to the rule, are of a striking crimson color. Similarly, the showiness of the White-bracted Sedge is due to the white drooping modified leaves, or bracts, which form a sort of receptacle for the cluster of inconspicuous flowers which all sedges normally possess.

This interesting sedge is one of many attractions on the savannahs—those remarkable areas in the low coastal country which are veritable wild-flower paradises. This sedge is likely to occur in clumps, or societies, so that as one walks across the savannahs he may see afar a gay company waving white banners in the languid breeze of the hot afternoon. He is certain at first to take them for a wonderful new wild flower, but, upon reaching them, a glance will show that here the display is made by the bracts.

To study the real flowers satisfactorily one must have a good lens and much patience, for these are very small indeed, and are put up in small packages called spikelets, which packages are in turn bunched together to form the head nestling in the base of the white bracts.

HIGH-MOUNTAIN TURTLEHEAD, FOUND IN THE MOUNTAINS

One of the most curious things about plants is the remarkable choice they sometimes make with regard to a place to live. The places they choose are, of course, sometimes very different from places where men would choose to live. Everyone knows that cold and dampness are bad for the health, yet it is exactly in such places that the High-mountain Turtlehead may be found. On and near the cold, damp high mountain-tops of the Appalachians from Virginia to Georgia is the "home, sweet home," of this hardy wild flower.

The beautiful turtlehead-like flower, which makes this plant famous, is of a rose-purple color and is large enough (one inch long) to make a very showy floral display, especially in the case of the larger plants, two feet or more tall; these will bear a number of flowers at the same time. The flower of this plant is a close relative of the common cream-colored turtlehead of the wet northern places, though this latter is also found in the South.

THE GALAX IS VALUED FOR ITS LEAVES, NOT ITS FLOWERS

The most interesting thing about Galax is the fact that this herb is far more widely known and enjoyed for its leaves than for its flowers. The high regard in which southern folk hold the leaves of Galax is well deserved; the foliar organs are truly unique in many ways. They are nearly round in outline, with a prominent heart-shaped base; the margin is irregularly wavy, with minute light-colored glands on the tips of the projecting parts. The main veins radiate from the base and divide by a simple system of forked branching. The blade is leathery and evergreen, shining on both sides. A rich bed of Galax made up of hundreds of these beautiful leaves is a sight never to be forgotten.

When the Galax leaves become a year or more old, they change to a rich bronze color, especially above. In this condition they are even more unusual than when green. The florists find a wide use for these deep reddish brown leaves. The

leaves thus have a value, and many a dollar has been earned by the mountain boys and girls in picking Galax leaves.

The flowers also are interesting. They are small, not over a fourth of an inch long, and are thickly borne on a single simple wandlike stem which comes out of the ground near the leaves. The Galax plant may be found in the southern Appalachians and eastward to the coast, though in the region near the coast it may be seen only in rich woods, generally on cool northward-facing slopes.

THE FLY POISON, ANOTHER FLOWER OF THE MOUNTAINS

In a thick forest of stunted red oaks over five thousand feet above sea-level, in the Mount Pisgah, North Carolina, country, the writer once saw a number of the finest specimens of the Fly Poison plant. Here, growing out of the rich leaf world, their wonderful white inflorescences, glimpsed here and there among the thick shrubbery, appeared like torches lighting up the cold, damp gloom of the high mountain woods.

The fly poison is a typical member of the Bunch-flower Family. Its small three-parted lily-like flowers are grouped much like those of the familiar hyacinth, which belongs to a related family. In the fly poison the flowers are smaller, more numerous, and arranged in a beautiful and very regular cylindrical inflorescence. Each flower on a slender stalk, which extends straight out from the central stem, faces directly outward, and with its fellows forms the exterior of a lovely floral cylinder.

The leaves of the fly poison are chiefly at the base, where they arise from the bulb-like rootstock beneath the surface of the ground. The plant gets its name from the reported statement that if the leaves are bruised and placed in water they will so poison the water that flies soon die after drinking it.

THE SAVANNAH WHITE ORCHID, FOUND IN THE LOWLANDS

One of the greatest wild-flower displays in Eastern America is that made by the Savannah White Orchids when they bloom in late June and early July. Hundreds of these pure white blossoms occur on an acre area. To the wild-flower lover no greater treat could be offered than a half-day in June spent wandering over a savannah covered by these exquisite flower-children of Nature.

If one plucks an inflorescence, he will note that the flowers are rather simple orchid types, except that these possess an unusually long spur. This slender structure extends from the lower petal toward the main vertical stalk and commonly passes it. The single flower is about one-half inch long and the inflorescence about four inches.

THE DOG-HOBBLE, FOUND ONLY IN THE MOUNTAINS

Dog-hobble is the mountaineer's name for what is more elegantly known as the Catesby's Leucothoë (Loo-ko-tho-ee). This plant is a very attractive shrub which is found only in the Virginia, Tennessee, Carolina and Georgia mountains. One encounters it frequently along the mountain trails where, in masses sometimes attaining a height of a foot, its shining thick lance-shaped leaves furnish one of the most beautiful kinds of foliage found anywhere. When abundant, the shrubs form such a tangle of stems near the ground that it is difficult for a dog to go through it—hence the name dog-hobble.

In April, from the axils of the leaves there appears a showy raceme of white flowers, each flower having the simple shape of a hollow cylinder, flaring at the end, where the small petal tips turn back. It is odd that the plant hangs such showy masses of flowers downward from the stem, where they are almost hidden by the spreading leaves. One must bend the branch back to see the flowers well.

The leaves of this plant, like those of other leucothoës, are poisonous. Honey produced from the flowers is also reputed upon good authority to be mildly poisonous. The writer well remembers the account given by an old mountaineer who, upon having his attention directed to the dog-hobble abundant around the camp, told of his experience with dog-hobble honey. He described it as a kind of drunkenness—but of course in the mountains one must be cautious as to the source of inebriety.

THE ATAMASCO LILY, OR WILD EASTER LILY

In those warm humid days of spring, when buds are swelling and the flocks of warblers are trooping through the South on their journey to northern nesting sites, then it is that the farm boy, as he goes for the cows at evening, notices a fresh new thing in the low, marshy

places. A wonderful six-rayed star of the purest white color has appeared amid the damp wreckage of last year's vegetation. Upon close examination this apparition of the Easter time proves to be an Easter lily, smaller, to be sure, than the customary Easter flower, but suggesting it by its flaring corolla. It stands, just the single flower, on the end of a slim straight stalk which has lifted this bit of snow-white loveliness to gaze for a brief period into the depth of the sky.

It is little wonder that the children of the South are frequently seen in the spring trooping homeward with their hands full of the Atamasco Lilies. If one of these children would pause a moment and examine this lily closely, he would notice right away that at the base of the flower this lily is very different from the true Easter lily. The atamasco flower appears to be borne on top of the seed-bearing part, while in the larger and truer lily the seed-producing portion is inclosed within the white corolla tube. This difference is really a very great one; so great, indeed, that the botanist puts the atamasco lily and its relatives into the Amaryllis Family instead of the Lily Family. So our beautiful wild flower is not a lily after all, but it at first sight looks so much like a lily that its common name will always be atamasco lily.

THE CLIMBING MILKWEED, COMMON IN THE SALT MARSHES

Every boy and girl knows the milkweed plant, with its rounded cluster of purplish fragrant flowers and its oval, pointed pod, which in the fall bursts open and scatters seeds with the finest of long silken hairs attached to them.

The Climbing Milkweed, about which we shall tell you here, is in the same family with the familiar milkweed. It has flowers somewhat like this latter plant and a pod very much like it, although not so thick. But it differs very much in its vegetative parts. The stem is a twining, climbing one, as much so as a morning-glory. The leaves are very peculiar in that they are very narrow and hang languidly from the spirally wound stem. Another strange thing about this plant is the fact that it is found almost altogether in salt marshes—those great areas along the sounds where the salt or half-salt water covers the ground when the tide is in.

It may be known to the reader that plants having their roots in salty water from the ocean have a hard time to take up that water; the salt in solution tends to prevent the water from being absorbed. This makes it necessary for the plant to check the water from going out of the leaves, for if it did not, the water would pass off faster than it is coming into the plant below, with the result that the plant would soon wilt and die. Our climbing milkweed has solved this problem by reducing its leaf and covering it with a thick sort of skin which the water cannot readily go through. Its leaves have, of course, like all plants, a large number of tiny little holes, or pores, but these do not let too much water pass. The plant, like a good business man, does not spend more than its income will allow. The flower of the climbing milkweed is greenish white and is constructed somewhat like the milkweed flower, having the curious five-lobed crown in the centre of it.

THE NARROW-LEAVED SPATTERDOCK OF THE LOW COUNTRY

In quiet waters of rivers and ponds in the low country one is certain to see the long narrow leaves of the Narrow-leaved Spatterdock floating on the surface of the water, where they always point downstream if the water is moving. The leaves may attain a length of sixteen inches, when they look more like pieces of green ribbon than anything else.

Especially interesting, however, are the under-water leaves of this plant, for it is one of those remarkable aquatic forms which possess two kinds of leaves. The submersed ones are much broader, and the thin blades have a crisped or wavy edge like lettuce leaves. The flower is very much like the common spatterdock, although if one looks at the top of the central seed-bearing part, he will find that the interesting radiating lines there will not be nearly so numerous as on the common oval-leaved spatterdock.

THE TRUMPETS, RELATIVES OF THE PITCHER PLANTS

The Trumpet, a southern relative of the pitcher plant of the northern bogs, is one of the gayest and most interesting plants in Dixieland. It is best seen in certain dark soils of low, flat lands (savannahs) near the coast. On such areas thousands of the yellow trumpets, or slender horn-shaped leaves, stand stiffly erect in little groups, like prim maidens at a garden party. And each maiden carries a

FAIR ORCHIDS AND WAVING LIZARD'S-TAIL

A savannah covered with White Orchids. The flowers are simple types of orchids, except that they possess a very long spur.

The Dog-hobble, or Catesby's Leucothoë, grows on southern mountain trails.

The Climbing Milkweed lives in salt marshes. Its leaf is thin, and its flower greenish white.

The Lizard's-tail plant relieves the dark places of gloomy southern swamps with its white torch-like flowers nodding in every breeze.

parasol, for these remarkable vase-like leaves bear from one side of the vase rim a sloping cover, called the standard, which actually does much to keep the rain from filling up the open "trumpet."

The summer-time tourist in the South is certain to have his attention arrested sooner or later by a great savannah brightened with myriads of trumpets.

As you have perhaps suspected, the trumpet leaf, like its pitcher-plant relative, is adapted to catching insects and using the soft parts of their bodies as food. Attracted possibly by the bright standard and by odor, insects fly into the mouth of this innocent-looking leaf and soon find themselves slipping down the perfectly smooth sides to their death in the water with which the trumpet is half filled. In late summer one can tear open the leaves and be certain to find the water filled with unlucky insect victims; all kinds of "bugs" may be found therein, their bodies falling to pieces and becoming massed into an ill-appearing mixture of wings, legs and body parts.

In strong contrast to the unfortunate victims are the insects which use the interior of the trumpets for the purpose of rearing their young. These larvæ feed upon the dead insects until they attain maturity. In this way the plant is cheated out of some of its food.

The flower of the trumpet plant is very much like that of the pitcher plant. It is more showy, however, at a distance, due to its bright yellow color and its somewhat larger size. Perhaps the most striking part of the flower—and this is very unusual—is the huge stigma, which remains on the flower after the corolla disappears.

So unique and common a plant as this one is certain to have a number of names. The following common names have been applied to it: Trumpet-leaf, Water-cup, Watches, and Biscuits. But one should always use Trumpets, for by this name they are best known, and they really resemble certain kinds of trumpets, especially the kind used by angels, for I am sure every boy and girl has seen in the Bible-story books pictures of angels with simple, long narrow trumpets pointing toward the sky.

THE WILD HYDRANGEA ALONG THE MOUNTAIN STREAMS

In the mountains one of the most interesting trails up the slope is the natural one made by the mountain stream. If one goes up a mountain stream in the Appalachians, especially the southern Appalachians, in midsummer, he is certain sooner or later to have his attention arrested by the white flat-topped mass of flowers of the Wild Hydrangea. Especially will he notice the individual flowers at the margin of the cluster, for these have very much larger, flaring petals than do the seed-producing flowers in the centre. Upon a closer look our wanderer will realize that these larger showy flowers are almost exactly like the flowers which make up the showy "snowballs" which are produced on the cultivated hydrangeas in yards. It is an interesting fact that the showy flowers of the hydrangeas, both wild and cultivated, are sterile; that is, they cannot produce seed. In developing the fine display to attract insects which in the wild form pollinate the fertile flowers, the showy flowers apparently had to give up their most important function.

The wild hydrangea is a weak shrub; and its stems frequently lean upon those of stronger shrubs and young trees. At the nodes of the stem and clustered in the axils of the leaves one often finds a thick mass of tightly overlapping reduced leaves. This is an insect-gall and is formed by the larva, or worm, stage of a kind of fly. The mother fly laid an egg in the bud, and out of it was hatched a tiny grub. The effect of its presence was to make the bud grow excessively large and furnish it a comfortable home with plenty of food in the pantry. Just what the little larva does to make the bud do all this, is still an unsolved puzzle to scientists.

When the reader next visits the eastern mountains from New York south, if he will look along the margins of the cool, brawling mountain streams, it is to be hoped he will find the wild hydrangea, with its interesting flowers and its curious galls.

FINE-LEAVED THOROUGHWORT, OR DOG FENNEL

On the eastern side of the Appalachian mountain-system, from Virginia south to Florida, grows a species of Thoroughwort, or Boneset, which is so different from the common boneset of the northern United States that no one but a botanist would ever dream that they were first cousins. This southern species is a tall feathery graceful plant which comes up in old fields and occasionally along roadsides.

PECULIAR AND INTERESTING FLOWERS

The Wild Hydrangea which grows by the banks of mountain streams. The large showy flowers toward the margin of the cluster are sterile.

The Fly Poison is a member of the Bunch-flower Family. It grows in high mountain woods. The leaves are chiefly at the base.

The Yellow Trumpets grow in the dark soils of low flat lands near the coast. Notice the "standard" above the trumpet mouth.

The Narrow-leaved Spatterdock has two kinds of leaves, the submersed one being much broader, and the edges are wavy.

So plume-like is it that one might successfully decorate ostriches with it, though on second thought one fears the native verdure of the ostrich would still hold its own for beauty. There is little doubt about the fact that this plant is one of the most attractive weeds now growing in the United States. Growing always in the same places where weeds are found, it naturally is looked upon as a weed itself, and no one pays much attention to it. Yet landscape architects could use this plant to the greatest advantage in places where a soft feathery effect from foliage is desired.

Locally, in the region where it grows, the plant is known as Dog Fennel. This is not a good name for it, for this common name has already been long used for another fine-leaved member of the Sunflower Family with white ray flowers and yellow central flowers.

Speaking of the Sunflower Family, every boy and girl should learn early that all such "flowers" as the sunflower itself and those of its relatives, the daisy, black-eyed Susan, dandelion and boneset, are not single flowers at all, but a compact cluster of very tiny, yet perfect flowers. Nothing about flowers is more interesting than that Nature, in developing the highest of all the plant groups, condensed the flowers into "heads," and in so doing greatly reduced the size of each flower. For most of the *Compositæ* (the name of this remarkable family) one must use a good magnifying glass to study these tiny flowers satisfactorily.

In the Fine-leaved Boneset it is interesting to observe that not only are the flowers reduced to tiny little ones, but the heads, or flower-clusters, are reduced also. Each head has only from three to six flowers inclosed in the cuplike structure made by the bracts. To balance the decrease in the number of flowers in the heads the plant produces an extraordinarily large number of these small heads. Many hundreds may be counted on a single plant. The delicate branching system which carries all these heads is in entire keeping with the much-branched feathery leaves below.

Fine-leaved Thoroughwort is commonly known in some localities as Dog Fennel. Its plumy foliage is very attractive, both while it is still green and after it has been killed by frost.

After summer is over and the plant is killed by the early frosts, its brown stalk, leaves and tiny starlike bracts stand throughout the winter. There is no more lovely sight than an old field on a frosty morning, in the eastern part of Virginia or the Carolinas, covered by the fine-leaved boneset. The tall graceful white plumes make the deserted place into a real fairyland.

THE BRACTED BUNCH-FLOWER OF THE SAVANNAHS

If one could string together a half dozen stars and have each star peeping out of a little jacket, he would not have anything more charming than the slender cluster of starlike flowers which is the Bracted Bunch-flower of the southern savannahs.

The Bracted Bunch-flower of the southern savannahs blossoms in August and September.

Borne two and a half feet above the ground on a wandlike stem, one may observe the six-rayed white flowers peeping out of close-fitting bracts. None of the relatives of this plant has its flowers so wonderfully protected up to the time of full flowering. The purpose of the bracts is to hold the tender growing flower-head until it is ready to expand outside of the bract.

When one finds this beautiful member of the Bunch-flower Family in August and September he is almost certain to meet them in large numbers. Just like folks, they occur in quantities in the same places. One must, to see them, go to the low coastal country from the middle of North Carolina southward.

MARSHALLIAS, MEMBERS OF THE COMPOSITE FAMILY

Under the name Marshallias may be grouped a number of different species which occur in southeastern United States. The flowers are so much alike that once one gets acquainted with one flower he will know the rest of them to be Marshallias wherever he finds them.

The "flower" is a head made up of a number of the real but tiny white or purple flowers all sticking up and out like pins on a pincushion. As you may guess, this plant belongs to the great Sunflower Family. The Marshallias are unlike most of the members of that family in that the corollas of the small real flowers are remarkably long and slender. There are no ray flowers, so that this cluster of delicate little slender flowers borne alone at the top of the plant makes it a very distinctive wild flower indeed.

THE SEA OATS, WHICH IS ALWAYS IN MOTION

On the sand dunes of the Atlantic coast south of New Jersey there grows one of the most attractive grasses to be found anywhere in America, called Sea Oats. It is a tall slender kind, bearing in the summer and fall a loose cluster of very large spikelets (the compact groups of the grass flowers) which dangle about in the wind in the most care-free manner. And they are swinging about most of the time, for it is seldom that the wind stops blowing over the exposed dunes.

In the fall, when the spikelets are dry and hard, the stiff winds cause them to rattle so hard that at night their rustling is likely to keep the camper awake. But of more interest is the fact that if one gathers a bunch of this grass in the fall, he may set it in the corner in an empty jar at home. There, like an attractive sheaf of golden grain, it will last a long time and will continually bring to mind the glorious days enjoyed by the sea. On most of the southern coasts this grass is the most permanent plant on the dunes, so that when you go to the seaside you will have no trouble at all in recognizing it.

These are not all the flowers and plants of the South, but we have told you of some which grow nowhere else. A few we have mentioned grow farther north, and many of those mentioned as growing in Canada and northern United States also grow in some of the southern states. There is much overlapping with flowers, just as there is with birds.

THE NEXT STORY OF PLANT LIFE IS ON PAGE 7169.

Though the Marshallias belong to the Sunflower Family, they have no ray flowers.

THE APPROACH TO HAVANA, THE CAPITAL OF CUBA

© Major Hamilton Maxwell, New York.

Havana Harbor, one of the safest in the world, has a narrow entrance, the left—or eastern—side of which is shown in the picture, with the old fort, El Morro, protecting the passage. On the opposite—or western—point you may imagine a companion fort, La Punta. These two sentinels have been standing on guard since about 1600.

Santo Domingo, the capital of the Dominican Republic.

THE ISLANDS OF THE WEST INDIES

CONTINUED FROM 7050

FOR three centuries after the New World was discovered the history of the tropical islands of the West Indies was one long tale of stirring adventure—of Spanish treasure-hunters, corsairs, buccaneers and bloody sea-fights. Before the time of Columbus there were legends of enchanted islands far out in the Atlantic that disappeared from view even as adventurous sailors were about to land upon their shores.

Look at the map of North America and you will see four large islands stretching more than 1,300 miles eastward from the entrance to the Gulf of Mexico, and forming the northern shore of the Caribbean Sea: Cuba, Jamaica, Haiti and Porto Rico. These are the Greater Antilles. Before the people in the Old World knew anything about the New World, some map-makers had decided that there was land between the Canary Islands and the Far East. On their maps or charts this land was named Antilia. When Columbus touched at one of these islands it was thought that he had come upon Antilia. Later, when not one but many islands were discovered, the name was made into the plural—Antilles. Curving outward and downward from Porto Rico until it almost touches the coast of South America is a chain of smaller islands which form the eastern end of the Caribbean; these are the Lesser Antilles. There is a still smaller chain of islands, the upper end of which almost touches Florida; these are the Bahamas, which are not a part of the Antilles at all. There are nearly 100,000 square miles of land in these islands, of which Cuba has almost one-half. Haiti, Jamaica and Porto Rico are next in size. Trinidad, another of the larger islands, lies away down at the lower end of the Lesser Antilles, so close to the South American coast that many always think of it as a part of that continent.

About the centre of the outer edge of the Bahamas is a tiny island of special interest, called Watling or San Salvador, because here it was long supposed that Columbus first trod on American soil. Some historians think that Cat Island, to the northwest, is the island which Columbus called San Salvador, which means "Holy Savior," in gratitude for, as he thought, reaching India by a shorter route. The two original tribes of "Indians" whom Columbus and the first explorers found were called the Arawaks and the Caribs. The Arawaks were a gentle race and were quickly exterminated by the Spaniards, but the Caribs fought

for every inch of their land, and a few of them still survive.

THE SPANISH GOLD-SEEKERS EXPLORE THE ISLANDS

The first Spaniards, who accompanied Columbus on his later voyages, or went with the leaders who followed him, were fortune-hunters. They did not want to till the soil; they did not even want to dig the gold which they hoped to bring back to Spain in such vast quantities. Work of any kind was unpleasant, and their purpose was to force the natives to dig gold for them. For this reason the first Spanish settlements were planted on the shores of Cuba, Haiti and Porto Rico, those big islands in whose mountains some gold was found. The low and sandy islands of the Bahamas, though first discovered, were neglected and left to other nations to settle or colonize. For the same reasons the Lesser Antilles were never settled by the Spaniards, though they claimed them as long as they possibly could.

The peaceful Arawaks, whom the Spaniards found living in the Bahamas and Greater Antilles, were not of the stock of which slaves are made. When they resisted the efforts of the Spaniards to force them to work in the mines, they were butchered. Those that were captured died soon after. In less than a hundred years after the first appearance of the Spaniards, there were only sixty families of natives in Cuba, and the neighboring islands had suffered in the same way. The Spaniards did not interfere with the Caribs, natives of the Lesser Antilles, a more warlike race.

© Publishers Photo Service. GREAT BARBADIAN WINDMILL

As soon as the Spaniards found that gold was not so plentiful in the Antilles as they had hoped, the treasure-hunters went farther. Cortes entered Mexico, to rob the Aztecs. Others sailed to the Spanish Main, as the coast of the South American mainland from the mouth of the Orinoco to Darien was called, in search of the fabled kingdom of gold, which they named "El Dorado."

NEGRO SLAVERY IS INTRODUCED ON THE PLANTATIONS

The Spaniards who remained behind gradually discovered that sugar, an expensive luxury in Spain, could be produced from the fertile soil of Cuba, Haiti

and Porto Rico at a large profit. They had learned from the Arawaks how to plant and smoke tobacco, and a demand was also growing at home. Cotton brought better prices than wool. This was the beginning of the rich trade which sprang up between Spain and the West Indies, and the need of labor to work the large plantations brought with it a trade in negro slaves. Large numbers were imported every year from the west coast of Africa. If you were to make a trip to the West Indies to-day, you would see how many black people and how few white people are living there now.

The ships of France, England and the Netherlands were at this time in search of new markets. They ventured to the Spanish islands, at first in the hope of picking up cargo. When the Spaniards would not allow this, the vessels were used as slave ships. Then these merchant pirates began arming their ships, and fell to plundering the settlements or to lying in wait for the treasure galleons of Spain and capturing them.

One of the most prominent of these sea-rovers was Sir John Hawkins, who made three trips, between 1562 and 1567, from the African coast, with slaves, to Hispaniola, as Haiti was called. On his third trip the Spaniards destroyed four of his five ships. At that time he had with him Francis Drake, then only a boy. Five years later Drake went forth in command of a venture of his own and raided the Spanish settlements on the Isthmus, though there was no war between England and Spain at the time. After the destruction of the Spanish Armada by the English, Spain began to grow weaker as a nation, and at the conclusion of peace with England she was content to keep only the four islands which she was occupying—Cuba, Haiti, Porto Rico and Jamaica.

OTHER NATIONS DEMAND A SHARE OF THE SPOILS

The English, the Dutch and the French began to occupy the smaller chain of islands, the Lesser Antilles, about this time. The Dutch West India Company was formed in 1621 and the French in 1626. The first English land grants which led to plantations in this region were given between 1623 and 1627. Each one of the great European powers had a different reason for wanting to take possession of the islands. Spain wished for gold and mineral wealth. France desired trade and settlements. The Dutch hoped to cripple their ancient enemy, Spain, by cutting off the sources of her wealth. The English intended to settle permanently.

The first English settlement in these islands was made in 1624 by Sir Thomas Warner at the head of a number of gentlemen adventurers. They first took possession of the island of St. Christopher, often known as St. Kitt's. The Caribs gave them a hard fight, and they had to call upon a French corsair named Esnambuc for help. As a result, part of the island was given over to the French. In 1636 the Dutch made a settlement on St. Eustatius, and in 1646 French colonists landed on St. Bartholomew.

The fierce Caribs, however, were by no means passive during these attempts to deprive them of their land. For many years they fought the invaders of their islands, with more or less success. Finally the few who remained, realizing that they must some day be overcome, made an agreement with the whites whereby the two islands of St. Vincent and Dominica were to be given up to them. Later many of them went to an island off the coast of Honduras. There, in Honduras and St. Vincent, the last of the fighting race of Caribs may be found.

THE ISLANDS PASS FROM HAND TO HAND

For nearly two hundred years after the first settlements of these islands, they frequently passed from hand to hand, for during this long period there was hardly a year in which at least two of the great powers were not at war with each other. The most important of these changes was the taking of Jamaica by an English fleet under Admiral Penn, the father of William Penn, in 1655.

In addition to the frequent wars between the four nations of which we have spoken, a fifth element entered into the fighting. During all this time the Spanish settlements in Haiti had been in the eastern part of the island, around Santo Domingo, while the western part was left to the natives, who lived by hunting wild cattle and hogs. Here the roving traders and adventurers would put in for supplies of smoked meat. These sea-rovers were largely French who had been driven away from the island of St. Christopher by the Spaniards.

THE RECKLESS BUCCANEERS RULE HAITI

This little colony of "boucaniers," or "meat-driers," which is what the French word means, settled in the island called Tortuga, just off the northwest of Haiti. Here they did a profitable business, and their little island became the centre of supply for the rovers and smugglers. These buccaneers, as the English called them, were raided by the Spanish in 1638. While away on a hunting trip their settlement was burned. In revenge they got together a fleet of vessels and made the robbing of the Spanish their chief business and pleasure. It was partly due to them that Spain lost one of her four big islands, Haiti.

Let us see how this came about. The "Brethren of the Coast," as the pirate-adventurers called themselves, went to the western end of Haiti. They were joined by other Frenchmen, who laid out plantations, brought slaves to work on the land, and prospered. Before the Spaniards were fully aware of the danger, these men had built a fort at the head of the bay which sheltered them and called it Port-au-Prince. After a war between Spain and France, which ended in 1697, Spain gave up this end of the island to France.

THE NEGRO REVOLT, AND THEIR LEADER, TOUSSAINT L'OUVERTURE

Ninety years later, on the eve of the French Revolution, this French colony had twice the population of the Spanish colony, and possessed more than twice its wealth and foreign trade. Then came the great French Revolution which declared all men equal. The white planters accepted the new order, but they refused to apply its principle of equality to the black slaves. Even the free negroes were not allowed to become citizens. The result was an uprising of the negroes, led by a young mulatto who had been educated in Paris. This so alarmed the French Government, especially as the English and Spanish forces were making a successful attack on the colony, that the negroes were declared free in 1793. This brought all the slaves over to the side of the French Republic.

At their head was now perhaps the most remarkable man the negro race has ever produced, Toussaint l'Ouverture, who was often called the Black Napoleon. He was a full-blooded black, born a slave, but with a genius for commanding men. The French saw his great ability, and made him commander-in-chief of the native forces. He drove out the English and Spanish troops, and in 1795 France and Spain made a treaty by which the Spanish colony on the eastern end of the island was ceded to the French. Toussaint l'Ouverture became governor-general and practically dictator. In 1801 he proclaimed the absolute independence of Haiti, with himself as supreme chief. Napoleon, who was then in power, sent out an army of thirty thousand men, and a long war followed. Yellow fever came to the aid of the struggling blacks. The French general asked for a conference, which Toussaint l'Ouverture granted and attended in person. Here he was seized and carried over as a prisoner to France, where he died in prison of starvation.

Meanwhile the blacks continued to fight. Finally the French forces were penned in and forced to surrender, and so France lost the greatest of her West Indian colonies. The Haitians declared their independence in 1804, and a colored man, General Dessalines, was proclaimed president for life. Very soon he declared himself emperor, with the title of Jean Jacques I, but he proved to be such a brute that two years later his own soldiers waylaid and killed him. Until 1844, except for a little time when Spain regained her colony at Santo Domingo, the whole island continued under one government as the Republic of Haiti. Then there was a split, and the old Spanish colony became the Dominican Republic.

THE DOMINICAN REPUBLIC AND ITS PEOPLE

The Dominican Republic is nearly double the size of the Haitian Republic, but has only 700,000 people. The most of these are people of mixed blood, part negro and part Spanish. But there are some Spaniards and a considerable number of negroes. Spanish is the language spoken. As a rule the inhabitants are lazy and shiftless. But when one looks at the blue sky, the purple mountains, the vivid tropic green of the plants, the feathery-topped graceful palms, it is easy to realize why people do not want to work. In a country where the houses have soft blue or pink walls and picturesque red roofs and seem unreal and dreamlike, naturally the residents are dreamers. But English and American business men

have disturbed the dreams. They wanted to make money out of sugar, coffee, cacao, mahogany, hides and honey. So they invested their money in the Republic. In May, 1916, the United States landed troops to preserve order when there was trouble among the natives, and now controls the island.

REVOLUTIONS IN HAITI, WHICH CAUSED THE UNITED STATES TO ACT

The history of the Haitian Republic has been a very stormy one. Almost every ruler, whether emperor or president, has met a violent death. The uprisings have been so numerous that the United States Government felt compelled to send a military force to restore law and order, and it is still held there.

The population of Haiti is somewhere between 1,500,000 and 2,500,000, of which about ninety per cent is pure black. The few whites are mostly foreigners, as the French planters were expelled shortly after the declaration of independence. So strong is the feeling against foreigners that they are not allowed to own land. The reason may be that the natives fear the whites might want to rule again.

SPAIN IN PORTO RICO, THE "RICH PORT"

After the capture of Jamaica by the English and the loss of their colony at Santo Domingo, the Spaniards kept only Porto Rico and Cuba. Like Jamaica, Porto Rico was much neglected. All through the seventeenth and far into the eighteenth century the beauty and riches of the island were overlooked. In 1700 there were only three villages on the island, and in 1765 there were only 45,000 inhabitants. At last Spain began to wake up to the value of this rich possession. Spanish peasants were sent out as real colonists and negro slaves were imported. In 1859 the Spanish Cortes, or legislature, granted a constitution to Porto Rico, which made it a province of Spain instead of a colony. The United States gained possession of this island during the Spanish-American War, which broke out in 1898.

The history of Cuba is by far the stormiest of all Spanish West Indian possessions. The Spaniard Don Diego Velasquez began the conquest of the island in 1511. Tales of treasure and legends

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THE MARKET PLACE OF SAN JUAN, PORTO RICO

of wealth were spread by Velasquez's sailors and brought colonists by the thousand to the spot. From Cuba went the expeditions that explored Yucatan, Mexico and Florida. It was no wonder that every pirate and freebooter on the Spanish Main kept a watch on the island and plundered the ships which entered or left the shelter of the forts. Those were stirring days of which the two forts El Morro and El Punta guarding the narrow entrance to Havana harbor are reminders. The strife was not due to outsiders only, but the Spaniards in Cuba could not agree among themselves. There was never peace on the island. Until the latter part of the eighteenth century the colony did not grow much. A good many French immigrants came into Cuba after the revolutions in Haiti. Wealthy planters from the South American colonies also came, and began to develop the land. The governor-general, however, was always a despot, with the power of a military commander in a besieged city.

All through the nineteenth century Spain had difficulty in controlling her colonists in Cuba. Beginning in 1827, one rising followed another. The United States interfered in 1898 and took over Cuba from Spain.

When the Spanish troops left, the United States took control, but turned over the island to the Cubans in 1901. In 1906 a revolution broke out, and the United States again held control until 1909. Cuba is now a republic with a population of about 2,500,000. Havana, with 350,000 inhabitants, is the largest city. The island has some important minerals, valuable forests and much fertile soil. It is one of the leading sugar-producing countries of the world.

JAMAICA, THE CHIEF POSSESSION OF GREAT BRITAIN

After the English occupation of Jamaica, Port Royal and Kingston, the chief ports, became the headquarters of the cruising buccaneers, rovers and slave-traders. Jamaica was always the best customer for African slaves, which indicated the rapid growth of sugar-planting. From this cause came the greatest disturbances in its history. Many of the blacks escaped to the mountains, where they lived in savage communities. These runaways, known as maroons, would descend from their strongholds and raid the settlements. An irregular warfare was carried on for many years. Finally peace was concluded by offering the maroons a reservation on which they would not be disturbed so long as they did not molest the whites. There were also violent uprisings of the slaves, even after they had been freed, in 1833. These were put down with a cruelty inspired by a fear of their vast majority in numbers.

THE EXPORTS OF JAMAICA

Throughout all the British West Indies the emancipation of the slaves caused heavy losses to the sugar-planters. With this misfortune came the discovery that sugar could be extracted from the beet as well as from cane. These two causes together seemed at one time to threaten the complete ruin of the West Indian planters. The sugar industry has never quite recovered. To-day bananas are Jamaica's chief export, followed by sugar, coffee and rum. Tobacco is of growing importance. As yet only a fourth of the island is under cultivation. Of the total population, numbering about 800,000, only 16,000 are white. There are about 20,000 Asiatic coolies, mostly Hindus, in Jamaica, who have been imported as plantation laborers. Many smaller islands are governed from Jamaica. Kingston, the capital, is an attractive city.

THE BAHAMAS DURING THE CIVIL WAR

The Bahamas, neglected by the Spaniards, and infested with buccaneers and pirates during the days of much fighting, became a British crown colony in 1787. The settlers were largely colonists from the United States who remained loyal to England and who left during and after the American Revolution. It was the contraband trade, that is, trade against the law, brought by the Confederate blockade-runners during the American Civil War, that gave these little islands, and especially Nassau, the chief port, their first prosperity. Trade is still largely with the United States. It consists mostly of sponges, hemp and pine-apples.

In the Lesser Antilles, Great Britain possesses most of the islands. Of these Barbados is the most important, though it is only twenty-one miles long and fourteen across. For its size it is one of the most thickly populated spots on the face of the earth. Barbados is used as a coaling station by the British Navy.

DRAKE'S LAKE OF ASPHALT IN TRINIDAD

Trinidad is a large island close up to the mainland of South America. At first it was thinly populated by the Spaniards, but after one of the several wars between them, Spain surrendered it to England. On the island is a great lake of asphalt. The story goes that Sir Francis Drake, when his ship sprang a leak, coolly landed in Trinidad and "paved" the cracks with this asphalt. Another gallant tale is that which tells of the sacking of San Jose de Oruna, the capital of Trinidad, by the dashing adventurer Sir Walter Raleigh. But those days are now memories. Asphalt from Drake's lake is exported to pave city streets. And people think of sugar, cacao, coffee and tobacco instead of fights with corsairs.

© Publishers Photo Service. THE ISLAND OF MARTINIQUE

MAINLAND POSSESSIONS OF GREAT BRITAIN

British Guiana and British Honduras, though mainland possessions, belong with the British West Indies. Both were brought under the British crown during the wars of the French Revolution. Guiana was the name given to a vast area east of the Orinoco River. Sir Walter Raleigh first penetrated these wilds in search of El Dorado, the land of gold, which led so many Spanish grandees across the western ocean. The Dutch were the first to make permanent settlements here, but when Holland was dragged into French politics, in 1796, she lost to Great Britain the Cape of Good Hope, Ceylon and the Guianas.

English settlers from Barbados attacked these Dutch settlements and took them with little difficulty. They were restored in 1802, but the next year Great Britain again took over what is now known as British Guiana. The colony is to-day of about the same size as Great Britain. Its government is still much the same as when held by the Dutch. Its regular crops are sugar and cotton. The negro element is very large.

British Honduras arose out of settlements of woodcutters, who migrated in the eighteenth century to the coast of Yucatan. They claimed to be independent of the rulers of Mexico. From about 1756 England began to extend her protection to these settlers about Belize Bay,

though she did not dispute the rights of Spain. Belize was the port of shipment for the dye woods and other timber. There a form of local self-government grew up. In 1798 Spain attempted to expel these intruders, but the settlers, aided by English sailors, repelled the assault and attained a sort of independence recognized by both powers. British Honduras is now a crown colony of Great Britain, and prospers because of its wealth of mahogany.

THE GOVERNMENT OF THE ISLANDS OF THE WEST INDIES

The governments of the British West Indian colonies do not give much power to the people. The reason is simple. It is the great number of negroes, who do not know how to govern themselves. In the Bahamas the negroes have little or no political power.

In Jamaica the negro outbreak of 1865 led the planters to desire the stronger government of a crown colony. The Barbados House of Assembly is very old. Trinidad and Tobago, a small neighboring island, have a legislative council in common, nominated by the crown.

FRENCH TERRITORY OF THE WEST INDIES

Though France can no longer be thought of as a colonizing power in the West Indies, she still possesses two important islands in the Lesser Antilles, Martinique and Guadeloupe, besides French Guiana on the mainland. The first of these will be remembered because of the great eruption of Mount Pelée in 1902, when 40,000 persons were killed by the lava and gas. The island is about forty-five miles long and fifteen across, but extremely mountainous. Martinique, as the centre of French life and activity in the West Indies, was much disturbed by the French Revolution. A serious outbreak of the negroes occurred in 1831, but was suppressed. In 1848 all the slaves were emancipated. The present population is estimated at 185,000, of which 10,000 are whites and the remainder colored. The governor and the council are appointed by the French Government. French Guiana has a population of about 50,000. The chief products are cacao, sugar, ginger, coffee and fruits. It has valuable gold-mines.

We remember Martinique chiefly because it was the birthplace of Josephine de la Pagerie, who afterward became Napoleon's consort—Empress Josephine. The ruins of the house are still to be seen in Fort de France, and her statue looks down on a town little changed since she set sail for France. Off the coast of French Guiana is Devil's Island, where Captain Alfred Dreyfus was confined for four terrible years, from 1895 to 1899.

THE DUTCH WEST INDIES

Curaçao, off the coast of Venezuela and west of Trinidad, is the headquarters of the Dutch colonies in the West Indies. Not only the neighboring islands of Buen Aire and Aruba, but Saba, St. Eustatius and part of St. Martin in the Northern Caribbees, are dependencies of Holland, administered by deputies of the governor of Curaçao. This island is about forty miles long, with a surface of dry plains. The inhabitants number about 30,000, of which about a third are negroes. Water is very scarce, and the people are compelled to store rain water. This they do by building tanks on the tops of houses, stores, barns, and in fact in any spot where rain could collect. And liquid which has been so difficult to obtain is not wasted as people in more fortunate countries waste water. Corn, cotton, sugar, tobacco and fruits, phosphate of lime, and the well-known liqueur curaçao, made from oranges, are the chief exports.

NEW TERRITORY OF THE UNITED STATES IN THE WEST INDIES

Up in the northern part of the Lesser Antilles, close to Porto Rico, are three islands which are of special interest to the United States. They are St. Thomas, St. John and St. Croix. St. Thomas, the most important, is only thirteen miles long and three wide. It is still a centre of traffic, as it has been since the early days, and nearly all of its 15,000 people, of whom nine-tenths are black or colored, live in and about the seaport, Charlotte Amalie. The buccaneers and pirates were not slow in finding this sheltered bay and using it as a refuge. In 1671 the Danish West India Company took possession and established a trading station. St. John and St. Croix together have about as many people as St. Thomas, but their trade is small. The United States desired these islands because of the need of a harbor for warships in the West Indies, and in 1916 purchased them for $25,000,000 from Denmark.

THE NEXT STORY OF ALL COUNTRIES IS ON PAGE 7131.

The great Municipal Pier.

CHICAGO, THE MAGIC CITY OF THE MIDDLE WEST

CONTINUED FROM 6850

ON the bed of what was a vast sea many, many years ago, stands Chicago, the magic city of the West. Though the town was laid out less than a hundred years ago, it now has a population of 3,000,000 and is growing rapidly. The present-day city-planners are preparing for a population of from 6,000,000 to 8,000,000 in 1950.

The first railroad locomotive did not arrive until 1848, yet Chicago to-day is the greatest railroad centre in the world; the first bank was established in 1835, and to-day Chicago is the banker to the Middle West. The first store was opened in 1804, thirty-three years before the incorporation of the city: to-day Chicago is the great central market of the United States. The first school was established in 1816: to-day Chicago is a great educational centre. The first street cars began operation in 1856: to-day the local transportation systems take more than 1,000,000 people in and out of the Loop daily. The first harbor improvement was made in 1833: to-day Chicago is the greatest inland port in the world. The first health board was organized in 1837: to-day Chicago has the lowest death-rate of all the large cities in the world. The first telegram was received in 1848: to-day Chicago has the largest telegraph office in the world, with more than 4,000 employees in all departments.

We can see now that Chicago had to be. The Chicago River portage was used by the Indians long before any white man had seen it. The Chicago River, which flowed into Lake Michigan, and the Des Plaines, the waters of which reach the Mississippi, are only a few miles apart, and canoes could easily be carried across the short space. Perhaps some wandering fur-traders visited the spot earlier, but the first white men we know to have stood on the ground were Father Marquette and Louis Joliet, in 1673 (see page 6631). Joliet was quick to see the advantages of the spot and pointed them out in a letter. Father Marquette spent the winter of 1674–75 here and suffered many hardships, in spite of the efforts of the friendly Indians. A cross of black mahogany stands at the foot of Robey Street on the spot which is believed to be the site of his hut. The gallant La Salle was here perhaps as early as 1679, but we know that he dated a letter from "Checagou" in 1683. During the next hundred years the region came to be well known to explorer and fur-trader, and during that time

was under three flags, that of France until 1763, that of Great Britain until 1783, and then that of the United States.

How the name Chicago arose we do not know with absolute certainty. We are told that the word meant in the Indian language "strong." So some people think it came from the wild onion which grew profusely in the neighborhood; others think it was from the skunk cabbage, which was also common; still others say there was an Indian chief named Chikagou who lived on the lake, and think that the name came from him. At any rate, a map published in Quebec in 1784 gives the name "Chekagou" to a river, but in the wrong place. In 1796, however, a corrected map shows the name "Chicagou" in the proper position.

The first permanent house of which we know was a log cabin built about 1779 by a black man, Jean Baptiste Point de Sable, a native of Santo Domingo. This he sold about 1796 to Le Mai, a French fur-trader, who in turn, in 1804, sold it to John Kinzie, the first white man to make his permanent home here, though a few other fur-traders had cabins in the vicinity. Kinzie added some rooms and a porch, and it was long the finest home in the village, and was also the post office when the little village began to receive mail.

Fort Dearborn is built on the Chicago River

Kinzie, who traded with the Indians, probably felt safe in bringing his family because a fort had been ordered built in 1803. In 1795, when General Wayne forced the Indians to make a treaty, he required them to cede a tract six miles square at the mouth of the river. Fort Dearborn, so called in honor of the Secretary of War, General Henry Dearborn, a Revolutionary soldier, was built on the south bank of the river near the mouth. The fort, which consisted of blockhouses and a stockade, was built during the winter of 1803–04 by the soldiers, who dragged the timbers for miles over the snow. The abutments of the new Michigan Avenue Bridge cover a part of the site, and there is a bronze tablet in the possession of the Chicago Historical Society which was for many years on a building at the corner of River Street, now called Wacker Drive. The first commander of the fort was Captain John Whistler, the grandfather of the famous artist James McNeill Whistler. Some of the little garrison had families, and a few settlers came; but there were more visitors—Indians, *voyageurs,* traders and wandering priests.

For fear of Tecumseh and his warriors Captain Heald, the commander in 1812, was ordered to evacuate the fort and proceed to Detroit. Captain Wells, with a few friendly Indians, came to help. The little band of soldiers and their families and a few citizens—less than a hundred in all—was ambushed about the present Eighteenth Street and Calumet Avenue. About half were killed at once, and the heart of Captain Wells was eaten by the Indians in order that they might gain his courage. Some of the captives were tortured and the remainder were spared, perhaps because of the influence of Kinzie, who had sent his wife and children across the lake in a boat, but himself went with the party in the hope of being of service. The next day the fort was burned, and for four years the unburied bones of the victims lay where they had fallen. A monument commemorating the massacre now stands at the lake end of Eighteenth Street.

The interesting story of John Kinzie

For several years after the massacre the region was desolate, but the fort was ordered rebuilt in 1816. From that time until it was permanently abandoned in 1836, there was sometimes a garrison, sometimes not. The danger of an Indian attack occasionally brought all the families in the neighborhood into the fort, to remain until the excitement subsided.

The Kinzie family returned to the house on the north bank of the river, which was not destroyed by the Indians, who seem to have had a high regard for John Kinzie. The house was destroyed long ago, and a soap factory occupies the site. A bronze tablet on the building marks the spot. Kinzie, like Paul Revere, was a silversmith, but, as you can imagine, there was little work for him in the wilderness. He grew prosperous by trading and by selling land which he had bought for a song, but occasionally he worked at his trade, and a few specimens of his handiwork are still in existence. Many of his descendants have been prominent in the city.

Gradually a few more settlers came, but the total taxes paid in 1823 were only

$11.42. In 1830 a map was made showing the residences of twelve families. Lots brought from $10 to $50, and some were sold for less. The settlement of the West was proceeding rapidly now. Ohio, Indiana and Illinois had been admitted to the Union as states. Michigan was being settled. In 1833 the little settlement had 550 people and was incorporated as a town, and new settlers arrived every week. Twenty-eight voters elected the first officers, August 10, 1833. Four years later there were over 4,000 people, the town received a city charter, and Chicago was on the way toward becoming a great city. However, it was not until 1843 that hogs were no longer permitted to run at large through the streets.

THE INDIANS MOVE ACROSS THE MISSISSIPPI

As elsewhere, the coming of the whites meant the going of the Indians. White men and red men could not occupy the same territory. The Indians agreed to move west of the Mississippi in 1833, after the Black Hawk War. To pay their claims $200,000 in silver was sent by wagon from Detroit. It is said that the money was all in half dollars, and that as soon as they were received most of them were exchanged for whisky as long as the supply in the hands of the traders lasted.

Then the drunken Indians, daubed with paint, danced and yelled through the streets of the future city brandishing their weapons. They greatly outnumbered the whites, and another massacre seemed possible. From the windows of the Sauganash Hotel, the largest tavern in the place, a few strangers looked out fearing a fatal ending of their visit to the Wild West. However, the excitement died down, the Indians departed for their new homes, danger from this source never threatened the city again, and Fort Dearborn was abandoned in 1836.

The Sauganash Hotel mentioned above was named by its proprietor Mark Beaubien in honor of a friend, a half-breed Indian. On its site was later constructed the Wigwam, a temporary structure in which Abraham Lincoln was nominated for the presidency in 1860. A bronze tablet now marks the site. When the fort was abandoned Beaubien's brother, John Baptiste Beaubien, bought from the United States the land now bounded by the river, the lake, State and Madison streets for the sum of $94.61. It is worth to-day at least $500,000,000, probably more.

This Mark Beaubien was an interesting character. He was fond of his fiddle and played at dances until he was an old man. It is said that he had twenty-three children, fifty-three grandchildren and lost count of the number of his great-grandchildren.

THE RAILROAD NOW COMES TO CHICAGO

After incorporation the city grew, but it could not become a great city until railroads were built. The first line was the Galena & Chicago Union Railroad, ten miles in length, which ran to the Des Plaines River. The equipment consisted of one second-hand engine, two second-hand passenger cars and six freight cars. This was the beginning of the great Northwestern Railway system.

Four years later the Michigan Central and the Michigan Southern entered the city, and communication with the East was established. From this time the growth of the city was rapid and continuous. No railroad passes through Chicago. All of the thirty-eight lines terminate here, and there are so many roads and so many side tracks that if they were put end to end they would make a double-track road from New York to San Francisco and have some miles left over. The city is now the greatest railway centre in the world.

THE FIRST RESERVOIR AND PUBLIC WATER SUPPLY

In the early days the rivers flowed sluggishly between banks only a few feet above the water. Much of the land was swamp, or else was so low that it was easily flooded when the rivers were swollen. A satisfactory water supply was a problem when only a few thousand people had gathered. In 1837 water works were built by private capital, and at Michigan Avenue and Water Street a reservoir was constructed and water was pumped from Lake Michigan. Customers were supplied through pipes made of logs through which a hole was bored. In 1851 the city took over the water supply, and as the refuse of the city polluted the water near the shore, the intakes were moved farther out into the lake. The city now has an abundant supply of good water.

GLIMPSES OF THE SOUTH SIDE

The University of Chicago is one of the largest institutions of higher education in the United States.

This aerial view shows a part of the Hyde Park residential section on the South Side and also Jackson Park, the site of the World's Fair in 1893. The enormous Fine Arts Building, which follows Greek architectural forms, has been preserved.

© Chicago Aerial Service Company.

Only a part of this drawing is real. The Field Museum and the Stadium behind have been completed, but the new station of the Illinois Central Railroad is yet to be built.

Photo, Burke & Koretke.

Many of the University buildings are built along the Midway of World's Fair days.

The new Union Station is situated just west of the river between Adams Street and Jackson Boulevard. The two main buildings are separated by Canal Street but are connected below the street level. It is one of the most complete and convenient of stations. Photo, courtesy Pennsylvania Railroad.

Meat-packing is the largest single industry in Chicago. This is a bird's-eye view of the plant of one of the firms which sends its products all over the world. Photo, courtesy Swift & Company.

THE CHICAGO RIVER IS MADE TO RUN BACKWARD

This early pollution of the lake was one of the chief reasons for the construction of the Chicago Drainage Canal, begun in 1892. This is one of the most important engineering works ever undertaken, in the course of which the Chicago River was made to flow backward and empty finally into the Mississippi and the Gulf of Mexico instead of into the St. Lawrence and the Atlantic.

The Chicago River was widened and deepened from its mouth to Robey Street, a little more than five miles. Then the canal proper was dug, much of the way through rock, from Robey Street to Lockport, on the Des Plaines River, a distance of twenty-eight miles. A new channel was dug for the Des Plaines River between Lockport and Joliet, seven miles. Thence the water goes into the Illinois and then the Mississippi. To relieve the southern part of the city the Calumet River has also been reversed and the smaller Calumet-Sag Canal leads from the lake to the main canal, about sixteen miles.

The main canal is 24 feet deep and has a minimum width of 162 feet. At Lockport electric power is developed where the water drops 41 feet on entering the Des Plaines River. It is the dream of the people of Chicago that this canal will in the future not only carry the drainage of the city, but will also carry a great commerce between the Great Lakes and the Gulf of Mexico.

To realize this object the State of Illinois is spending $20,000,000 in building a connecting channel from the end of the Drainage Canal at Lockport to the navigable portion of the Illinois River near La Salle, a distance of 65 miles. It is estimated this work will be completed within three years. Meanwhile, although a diversion of 10,000 cubic feet of water per second from Lake Michigan was recognized in the International Boundary Water Treaty of 1910, certain cities on the Great Lakes as well as the Canadian Government are now objecting on the ground that the diversion is responsible for lowered lake levels. To settle this issue the Mississippi Valley states have united with Chicago and the State of Illinois in seeking legislation from Congress which will fix a definite diversion for navigation purposes.

HOW CHICAGO CLIMBED OUT OF THE SWAMPS

When Father Marquette and his two companions were spending that dreary winter of 1674–75 beside the river the ice in the river broke up and blocked the current, which spread over the land. The little group climbed trees with their belongings to save them. Such floods occurred occasionally after the settlement began, and early in 1849 came the "great flood." The water of the Des Plaines overflowed into the drainage basin of the Chicago River, and the water came down the river carrying bridges and buildings with it. This could not be permitted, and so, beginning in 1857, the level of the low-lying parts of the city was raised from ten to fifteen feet. The Tremont House was a four-story brick-and-stone building. A young building-contractor promised the proprietor that he would raise it and "your guests will not miss a single meal or a wink of sleep." He kept his promise. This was George M. Pullman, later to invent the car which bears his name.

In 1860 the Republican Convention which nominated Abraham Lincoln met in Chicago, then a city of 109,260 people. Stephen A. Douglas, the candidate of the Northern wing of the Democratic party, was a resident of the city. During the Civil War the city was filled with marching men and waving flags. Through Chicago a great part of the food for the Union armies passed. A large prison camp for Confederate prisoners, Camp Douglas, was maintained. With the great westward movement after the close of the war thousands passed through Chicago, and many remained.

MRS. O'LEARY AND HER FAMOUS COW

By 1870 the city was the fifth in size in the United States and had over 300,000 people. The next year came a disaster which might have shaken the confidence of a people less confident of the future. This was the "Great Fire," which began in a barn on De Koven Street, on the West Side, and raged for more than twenty-four hours. The section was one of small houses built largely of wood, and there were lumber yards in the vicinity. The weather had been unusually hot and dry for weeks. Mr. and Mrs. O'Leary occupied a house on De Koven Street, and in the barn behind

THE INTERIOR OF THE BOARD OF TRADE BUILDING

The Board of Trade Building, at the foot of La Salle Street, is the nerve-centre of the grain-and-provisions trade of the world. Every day millions of bushels of grain as well as much pork, lard, etc., are bought or sold. Strangely enough, this elevated platform is known as the "Wheat Pit." The building is no longer large enough for the business transacted and is to be replaced in the near future.

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were a horse and some cows. It seems that Mrs. O'Leary often milked her cows by lamplight, though she afterward claimed that on this particular day she had finished her milking by daylight. At any rate, the fire department found an overturned kerosene lamp in the ashes of the stable, and there is little doubt but that the fire began here on the night of October 8, 1871, about the hour of nine.

A stiff but variable wind was blowing and the flames swept on their conquering way. They leaped the river to the South and then to the North Side, destroying buildings supposed to be fireproof as well as those of flimsy materials. On the South the destruction was checked by blowing up buildings in the path of the fire with gunpowder, but almost the entire North Side had been wiped out when the welcome rain began to fall, twenty-seven hours after the alarm had been sounded.

THE ENERGY OF THE PEOPLE OVERCOMES THE DISASTER

Only the San Francisco fire of 1906 can be compared with this calamity. About 250 lives were lost, and 100,000 people were left homeless, and in many cases penniless. The number of buildings destroyed was 17,450, covering about one-third of the area of the city. The total loss of property was estimated at $196,000,000. Less than half of this was covered by insurance, and many of the insurance companies were unable to pay their losses in full, so that less than one-fourth of the loss was received for rebuilding.

Relief poured in from all sides—about $5,000,000 in all—of which $1,000,000 came from Europe, half of this from England. Soon the worst cases of suffering were relieved, and the energy of the Chicago people did the rest. The story of one man is typical. He had had a flourishing business in a fine building. On the morning of October 10, while the bricks were still hot, he put up a board shanty with the sign: "Everything gone but wife, children and energy." Within three years most of the visible evidences of the fire had disappeared. New buildings, better than the old, had gone up, and the Census of 1880 showed Chicago fourth in rank among American cities.

Chicago took up steel construction very early, and the first all-steel-frame building ever constructed is said to have been the building of the Home Fire Insurance Company, constructed in 1885 at the corner of La Salle and Adams streets. This was ten stories high and was truly a skyscraper in its day. Since that time many towering structures which overtop the modest ten stories of the first attempt have been built.

THE WORLD'S FAIR COMES TO CHICAGO

The most important landmark in the later history of the city was the World's Columbian Exposition. As the four-hundredth anniversary of the discovery of America approached, the idea of celebrating by a great exposition took hold of the American people. Several cities desired to be chosen as the site, but Chicago and New York were the chief contenders. Chicago won, and at once set to work to surpass anything ever accomplished in the past. It was not possible to get ready in 1892, and so the exposition was held during the summer of 1893.

The site chosen was Jackson Park on the lake front. The leading architects, sculptors and landscape-artists of the nation were intrusted with the work. They had never had such an opportunity before, and the result was a miracle of loveliness and good taste. Though built of a mixture of plaster and fibre called "staff," the "White City" had the effect of being built of white marble, or, in the case of a few buildings, of colored stone. There were over 27,500,000 admissions to the grounds from May to November. From every part of the United States and from every country of the world visitors came to see and to learn. Chicago's contribution was about ten and a half million dollars, besides other millions spent in preparing the city for visitors.

The Fine Arts Building was not torn down when the exposition was ended, but for nearly thirty years held the collections of the Field Museum, since transferred to the beautiful new building in Grant Park. Tucked away on the Wooded Island is a reminder of earlier days in Illinois. It is the Cahokia Court House, the first public building in Illinois, brought from the southern part of the state and set up here. It was built in 1716 and served as a seat of government for French, British and Americans.

CHICAGO FROM EARLIEST DAYS

CHICAGO, OR WOLF'S POINT, IN 1832, WITH WOLF'S TAVERN ON THE LEFT AND MILLER'S TAVERN ON THE RIGHT

THE CITY OF 324,000 INHABITANTS BEFORE THE GREAT FIRE OF OCTOBER, 1871

A VIEW SHOWING SOME OF THE DAMAGE DONE BY THE FIRE, WHICH SWEPT OVER 2,100 ACRES

These pictures and that of Fort Dearborn on page 7114, are reproduced by courtesy of the Chicago Historical Society

MICHIGAN BOULEVARD, LOOKING NORTH, WITH GRANT PARK ON THE RIGHT, THE BLACKSTONE HOTEL ON THE LEFT, AND THE ART INSTITUTE IN THE RIGHT CENTRE

© Chicago Aerial Survey Company.

THIS VIEW SHOWS BRIDGES ACROSS THE CHICAGO RIVER AND THE MUNICIPAL PIER BEYOND. FROM LEFT TO RIGHT THE LARGE BUILDINGS ARE: THE FURNITURE MART THE TRIBUNE TOWER, TWO WRIGLEY BUILDINGS, THE LONDON GUARANTEE AND ACCIDENT BUILDING (LOCATED ON THE SITE OF OLD FORT DEARBORN), AND THE BELL BUILDING

Photo, Ewing Galloway.
MICHIGAN AVENUE, LOOKING NORTH FROM SUPERIOR STREET. THE OLD WATER TOWER IN THE CENTRE IS NO LONGER IN USE, BUT AT NIGHT IS ILLUMINATED BY FLOOD LIGHTS

© Chicago Aerial Survey Company.
AN AIR VIEW OF THE GREAT BUILDINGS IN THE HEART OF THE CITY, CLUSTERING AROUND THE METHODIST TEMPLE, WHOSE SPIRE FORMS THE CENTRE OF THIS GROUP. GRANT PARK IS BEYOND

CITY TOWERS AND VISTAS

© Ewing Galloway.
MICHIGAN BOULEVARD, LOOKING SOUTH FROM GRANT PARK NEAR THE PUBLIC LIBRARY

THE GREAT BASCULE BRIDGE AT MICHIGAN AVENUE OPENED FOR THE PASSING OF A BOAT

© Burton Holmes, from Ewing Galloway.

ANOTHER VIEW OF BEAUTIFUL MICHIGAN AVENUE, LOOKING NORTH, WITH THE WRIGLEY BUILDING AND THE TRIBUNE BUILDING FACE TO FACE

How the plan of Chicago came to be

The millions of visitors to the exposition emphasized what thinking citizens already knew. Chicago had grown without any plan, except that the usual checkerboard system of streets so common in America had been followed. The business district, hemmed in on two sides by the river and on a third side by the lake, was crowded, and increasing population made the situation almost impossible. So the Chicago Plan was drawn up, after years of study, by a committee of experts. It owed much to the Chicago architect Daniel H. Burnham, who had had so much to do with the development of the "White City."

It was not expected that all the features would be carried out at once, but the whole was divided into convenient units. Carrying out any one of these would give some relief and at the same time add to the attractiveness of the city, and the completion of each unit would bring the whole that much nearer. The plan was accepted by the City Council, and the Chicago Plan Commission was organized. This body has the power to advise but not to execute, and the members have given much valuable service to the city.

Chicago has always believed in her future and in the idea that public improvements promote prosperity. Paris underwent a transformation of unparalleled magnificence under the Emperor Napoleon III and Georges Eugène Haussmann, prefect of the Seine, which made that city the most beautiful capital in Europe and which still brings millions of visitors to her gates and millions of dollars to her people. The improved area of Paris was about 31 square miles. The area of Chicago for which improvements are completed or are under way is 205 square miles, or six times that of Paris. In eight years Chicago spent $167,904,917 on public improvements, not including the expansion of the water-works system. Civic betterments completed during these eight years exceed those made in forty-three years previously.

Some of the improvements which have been made

The first item was the widening of Twelfth Street, now called Roosevelt Road, which brings the traffic of the West Side to the lake. Then came the Michigan Avenue improvement, including the new double-decked Michigan Avenue Bridge. Part of the wide avenue is in two levels also, and some other double-decked streets will be constructed. Then came the improvement of South Water Street. A new municipal pier has been constructed. Wide diagonal streets will be cut some day.

Chicago is building a vast machine of civilization. No community was ever more unified in the determination to beautify its city. Remnants of the old city are being scrapped in favor of progress. Twenty-two separate and important features of the Plan of Chicago are now in the workshops of the city, county, state and Union. The Plan of Chicago is an all-Chicago plan. It proposes 200 miles of street widenings, extensions and improvements, and a remodeling of the railroad and terminal facilities. The $80,000,000 Union Station group and the $70,000,000 electrification programme of the Illinois Central are now under way, and the station itself has been completed. The Plan also includes: the creation of additional harbors; making-over the local transportation system; a vast park development along the shore of Lake Michigan, which is well under way; and the enlargement of the system of forest preserves, 30,000 acres of which now surround the city.

Who are the people who have made Chicago?

We have now spoken of the history of Chicago. Who are the people that have done these things? Some would say that you cannot understand Chicago without knowing something of the early settlers of this part of the United States. They came from New England and the Northeast; they came from the Southeast. The two tides met and mingled in the Old Northwest Territory, and the resulting blend had, so some residents of the Middle West say, the best qualities of both South and North. Naturally Chicago, as the metropolis of the region, would draw to itself some of the most energetic of this population.

Whether this explanation be the true one or not, Chicago was fortunate in the qualities shown by its early settlers, and their descendants reflect no discredit on their ancestors. But these descendants have long been in a minority. Chicago has attracted individuals from every state

in the Union and from every nation in the world. While the Census of 1920 showed that over 70 per cent of the population were born in the United States, only 23.8 per cent were native whites of native parentage, while 32.9 were native-born of foreign parents, 9.3 per cent were born of mixed parentage, and 29.8 per cent were foreign-born. Of the foreign-born, Poland furnished the largest number, 137,611; Germany came next, with 112,288; Russia next, with 102,005. Other countries furnishing more than 50,000 were Italy, Sweden, Ireland and Czecho-Slovakia in the order named, while more than 25,000 natives of Austria, England, Canada and Hungary were found. The numbers from other countries ranged from several thousands down to 41 Portuguese and 27 Albanians, while 228 were born at sea. No matter where born, or who their ancestors were, all believe in Chicago and are intensely loyal to the city.

Another interesting fact may be noted. Jealousy of a great city is often shown by the people of the smaller cities and towns of the section in which it stands, and the people of the rural districts often share in this feeling. Little of this feeling is shown toward Chicago. The people of the Central states are only less proud of the city than its inhabitants.

How the People Make Their Living

Now let us see what is in Chicago today. Our many pictures will serve, better than pages of text, to show you the extent and the immensity of the city, but we may tell you how the people make their living. The answer, of course, is commerce and manufacturing. There are over 15,000 factories of various kinds in and around the city, making it second only to New York. The product of these factories is valued at billions of dollars, and increases every year.

The largest industry, and the one for which the city is best known, is meat products of all kinds. They are sent away, not by the car-load, but by the train-load or the ship-load, and go to every part of the world. The packing-plants are marvels of efficiency, and nothing is wasted. An old joke is that they save everything connected with a pig except the squeal. Skin, hair, bristles, feathers, bones, hoofs and refuse are all turned into useful articles.

There are dozens of other important industries. Immense quantities of iron and steel are made in the city and its immediate suburbs. Foundries make castings of iron, steel and other metals. The manufacture of agricultural machinery and railway cars is very important, and we may mention also clothing, shoes, gloves, furniture and other lumber products, motor trucks, motor cars and motor supplies, electrical supplies, plumbers' supplies and many others, not forgetting the printing industry. The bakery products and the confectionery are worth millions, and so are the pianos and organs and the medicines.

Though manufacturing is important, commerce must not be forgotten. Chicago is the greatest grain market in the world, and the greatest produce market, as well as the greatest market for live stock. The warehouses can store 60,000,000 bushels of grain. Chicago buys a large part of the products of the Central states and distributes them to the world.

On the other hand, in addition to her own manufactures, the city collects the products of the world and distributes them over the great central region. The wholesale trade is estimated at six billion dollars a year. From Chicago go dry goods, general merchandise, foodstuffs, seeds, machinery, jewelry, musical instruments, wearing apparel, paint, household furniture, and thousands of other things.

The Book with the Largest Circulation

Chicago has some of the largest and finest department stores in the world. Some of them own their own textile mills, make up the cloth into garments or other things in their own factories, and sell the products over the counter; or they may contract for the whole product of dozens of factories making different articles. Buyers go to every part of the world seeking goods for the customers of the great store, and in every important market there are buyers resident the year round.

The mail-order business is an interesting development. There are enormous establishments which have no shops or salespeople, but sell literally everything through the mails. They print great catalogues, hundreds of pages with thousands of illustrations, and it is said that more copies of the catalogue of one firm

A PARK AND A PALACE

Garfield Park, on the West Side, is one of the most attractive of the many parks of Chicago. This is the Lagoon, which is usually more crowded than it appears in this picture. There is also an enormous conservatory in which flower shows are held. Photo, Kaufmann, Weimer & Fabry Company.

Some of the largest and most costly residences are on Lake Shore Drive, on the North Side. This is the Potter Palmer residence, which has been the scene of many famous social affairs. The work of Hunt, Richardson and other famous architects is represented on the Drive. © Ewing Galloway.

are annually printed than of any other book published anywhere. In almost every home in the villages and rural districts you are likely to find a copy.

Local tunnels have been a great aid to commerce. The city is honeycombed with tunnels for many purposes. Some bring and distribute water, others carry street cars under the river, while far below the surface there are over 60 miles of freight tunnels. These carry goods to and from the freight stations, deliver coal and building material, carry away ashes and the dirt from excavations. They keep thousands of trucks off the crowded streets.

WHY THE COMMERCE OF THE CITY HAS GROWN

From the beginning transportation has been important in making the Chicago of to-day. No great city exists to-day which does not possess advantageous means of transport by rail or water. Chicago has both. Those who discovered the site of Chicago, as well as its first citizens, arrived by water, and water was the first means of transportation. Early trade was on an east-and-west line from Chicago to the Atlantic coast through the Great Lakes. The Illinois & Michigan Canal, opened in 1848, exercised an important influence on the early life of the city as well as on the development of northern Illinois. Then came the railroad-building era, and the fact that Chicago with its thirty-eight railroads is the leading railway centre of the world is no accident, but the direct result of economic advantages of location. Its position at the foot of Lake Michigan, in the centre of the country's richest agricultural area, surrounded by coal, iron, lumber, and other natural resources, made this inevitable. Further, the possible water competition by way of the Great Lakes has kept Chicago's freight rates reasonable. To-day, though continuing to support its railroads, Chicago is looking once more to water transportation to supplement its rail facilities.

CHICAGO MAY SOME DAY BE AN OCEAN PORT

Though the sand bar at the mouth of the river originally allowed nothing larger than a canoe to pass, the harbor now provides for large ships. Steamers connect the city with all the other ports of the Great Lakes, and one line runs small vessels to Europe. The governments of Canada and the United States are now considering the Great Lakes–St. Lawrence Waterway. At present some of the canals around the rapids are but 14 feet deep, and so only smaller vessels can pass. If the waterway can be deepened so that the largest vessels may pass, Chicago and other lake ports will have the advantages both of ocean ports and of inland cities. Some day we may see great steamers sailing from Chicago for the Gulf of Mexico and South America, and others for Liverpool.

Now that we have spoken so much of the size of the city, let us look at the city itself. It stretches for more than 26 miles along the southwestern shore of Lake Michigan and has an area of 205 square miles. The site is a flat plain through which the Chicago River, a sluggish stream made by the junction of the North and South branches, used to flow into the lake. These rivers divide the city into the North, South and West sides.

The centre of the downtown business district is known as the Loop, because the tracks of the elevated railroads encircle the greater part of it. It is a very busy section, including, as it does, the Post Office, the City Hall, the Board of Trade, and other public buildings, the Courts, the most important stores, wholesale and retail, most of the leading banks and many hotels, and fine office buildings, besides important railway stations. It is hard to realize that this whole section was a pasture less than a hundred years ago. Recently some of the finest office buildings and some fine hotels have been erected on the North Side of the river, as you can see from the pictures.

A TOUR THROUGH THE PARK SYSTEM

In recent years tours of the parks and boulevards have rapidly gained in popularity among the throngs that visit the city. As we start north on Michigan Avenue opposite Grant Park, the first point of interest reached is the new Boulevard Link Bridge, opened to the public in May, 1920. Michigan Avenue from Randolph Street north has been improved from a 66-foot gap of squalor to a thoroughfare 130 feet wide, which completed the chain of boulevards from Jackson Park on the south to Lincoln Park and Sheridan Road on the north, and in addition relieved congestion at one

of the most crowded points to be found anywhere. The new Wrigley Twins and the Tribune Tower are at the north end of the bridge. Both the bridge and the avenue at this point have two levels—the lower one for heavy traffic, the upper one as a light traffic-way and main-entrance thoroughfare to the store and office buildings. The approaches to the two-level section are very gradual slopes, and one hardly realizes that he is passing

famous Midway, whose name is derived from the great "side shows" of the World's Fair, the Midway Plaisance, where in 1893 lived more different races of men than probably ever were gathered before or since. In this section are the beautiful buildings of the University of Chicago.

Jackson Park, scene of the World's Fair, is reached next. At the present time the Fine Arts Building and the

Photo, courtesy Goodrich Transit Company.

Many large steamers ply upon the Great Lakes and carry an immense volume of traffic. This is the steamer City of Saugatuck leaving Chicago. In the mist we can see some of the skyscrapers of the city.

from the city grade to an upper level. The link involved the partial or total demolition of many buildings. On the North Side at the foot of Grand Avenue is the Municipal Pier; and still further north, Lincoln Park, with its zoo, bathing-beaches, bridle-paths, tennis courts, golf links, baseball diamonds and yacht harbor, and Saint Gaudens' famous statue of Abraham Lincoln.

Encircling the city, the boulevards lead through Humboldt Park, Garfield Park, Douglas Park and Washington Park. Here the road turns and runs along the

structure on the Wooded Island are about all that remain of the "greatest show on earth." The way north leads through Hyde Park and finally Michigan Boulevard, and along "automobile row" till Grant Park is again in sight; or you can cross the new bridge at Twenty-fourth Street and follow the outer drive past the new permanent home of the Field Museum of Natural History and Chicago's beautiful new stadium.

Within the city are 5,000 acres of parks and playgrounds. With 143 parks, ranging in size from less than an acre

to more than 542 acres—the larger ones are connected by the boulevard system, more than 80 miles in length—every section of the city has a park that is easily accessible. In addition, the city maintains, usually in connection with a public school, 72 public playgrounds equipped with various sorts of apparatus, where the child and even the grown-ups may find diversion. Chicago is one of the pioneer cities in recognizing the needs of childhood and is meeting these needs on a scale unequaled in any other American city.

SCHOOLS, COLLEGES AND UNIVERSITIES IN THE CITY

Chicago is a great educational centre. There are nearly 300 public schools, with nearly 10,000 teachers and a half million pupils. The many high schools are of every sort—literary, commercial and technical—and their standards and courses of study compare favorably with those of the ordinary college not many years ago. There are also many good private schools.

Chicago University is one of the largest and wealthiest institutions of higher education in the country, and its reputation is world-wide. The buildings, which are located along the Midway of World's Fair days, form an imposing group. The professional schools of Northwestern University are also in the city, though the undergraduate departments are at Evanston. Loyola University and the De Paul University, Catholic institutions, offer a wide variety of courses to thousands of students. Armour Institute of Technology offers courses in engineering, architecture and science, and the Lewis Institute gives practical scientific courses for both sexes. There are also several medical and dental schools, theological seminaries, schools of law and pharmacy, and a veterinary college.

The Art Institute in Grant Park contains a priceless collection of paintings, sculpture and other objects of art, and also holds many special exhibitions. More visitors enter its doors than those of any other similar institution. It conducts the largest art school in America, and the instruction is intended to fit every need. Indeed, there is much to support the statement of one of the university presidents that in number, character, standards and wide range of courses offered, Chicago may claim to be the leading educational centre of the whole country.

OTHER IMPORTANT MEANS OF EDUCATION

In a modern city the library facilities are important from the standpoint of education. The Chicago Public Library on Michigan Avenue occupies an imposing building and has one of the largest collections of books in the country. It has about 40 branches for circulation. The city is also fortunate in having important privately endowed libraries. The John Crerar Library, on Michigan Avenue opposite the Public Library, has more than a half million books, and the Newberry Library, on the North Side, is especially strong in music, genealogy and religion. The Library of the Chicago Historical Society contains valuable collections.

Another educational institution of high value is the Field Museum of Natural History, endowed by the late Marshall Field. For nearly thirty years the collections were housed in the Fine Arts Building of the World's Fair, but are now in the new building in Grant Park, said to be the largest marble building in the world. The collections are visited by thousands seeking instruction, both children and adults.

The city is about to spend $5,000,000 to preserve the Fine Arts Building generally acclaimed by art authorities as an excellent modern example of Grecian art. In future the building will be used in part as a storage place for large art objects and in part as a large convention hall for some of the larger groups meeting in the city.

The city has shown a keen interest in good music. The Chicago Symphony Orchestra was founded by Theodore Thomas in 1891, and was under his direction until his death in 1905. His name was then given to the orchestra and was kept until 1913, when the old name was revived. The high standard set by the founder has been maintained, and the semiweekly concerts are well attended. The hall in which the concerts are held was built by public subscription. Since 1910 the Chicago Grand Opera Company (now the Civic Opera Association) has given a yearly season of grand opera of the highest quality in the Auditorium. Some distinguished European artists have been introduced to America, and at the

Photo, E. L. Ray.

Evanston, near Chicago, is a combination of college town and city suburb. .The largest of several educational institutions is Northwestern University, founded in 1851, under the control of the Methodist Episcopal Church. The professional schools are in Chicago. This is University Hall, one of the many buildings.

© Burton Holmes, from Ewing Galloway.

A general view showing some of the many buildings of the University of Chicago is given on pages 7108 and 7109. This picture shows the Chapel Tower, which resembles Magdalen Tower at Oxford. The present Chicago University replaces an institution founded in 1857 which was forced to close its doors in 1886.

same time opportunity has been afforded to Americans of talent.

Many other well-known musicians have been residents of Chicago. Among them may be mentioned George Frederick Root, composer of The Battle Cry of Freedom, and Tramp, Tramp, Tramp, the Boys Are Marching, and many other songs popular in their day; Reginald de Koven, the composer of Robin Hood, whose father wished him to be a banker; Jessie Bartlett Davis, a delightful singer in light opera; and Fannie Bloomfield Zeisler, the famous pianist.

Among other educational influences, Chicago has one that is unique. In 1905 Benjamin F. Ferguson left in his will a million dollars, the income of which is to be used for the "erection and maintenance of enduring statuary and monuments" in the city. The fund is under the control of the Art Institute, and from time to time some historic event is appropriately commemorated, or some thing of beauty is added to the possessions of the city.

© Ewing Galloway.

Adams Street near Michigan Avenue. The Art Institute, seen in the centre, is in Grant Park across the avenue.

Among the objects purchased wholly or in part from the income of the fund are the Fountain of Time in Washington Park, and the Fountain of the Great Lakes, south of the Art Institute, both by Lorado Taft; the Eugene Field Memorial in Lincoln Park, by Edward McCartan; the Statue of the Republic in Jackson Park, by Daniel Chester French; and the Marquette Monument on Marshall Boulevard, by Hermon A. MacNeil.

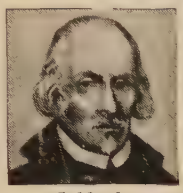
Much important literary work has been done in Chicago. Hamlin Garland wrote many of his best stories while a resident of the city. Eugene Field, "the poet of childhood," did his best work while on the staff of a Chicago newspaper. Finley Peter Dunne, the creator of "Mr. Dooley," found his inspiration here. Henry B. Fuller, Frank Norris, George Ade, William Vaughan Moody, Robert Herrick, Carl Sandburg and Emerson Hough, all lived in Chicago. Edgar Lee Masters, best known for his Spoon River Anthology, is a Chicago lawyer.

The central situation, the unequaled railway facilities, the size and quality of the hotels, together with the hospitable attitude of the people, make Chicago a favorite convention city. Since 1860 the Republican National Convention has met here ten times, and the Democratic Convention five times. In 1904 Theodore Roosevelt received the Republican nomination here, and in 1912 that of the Progressives. Many organizations choose Chicago for a meeting-place. In one recent year over seven hundred conventions met in the city.

It may seem that we have used a great many superlatives in telling of Chicago. It is true, but the story is so unusual that they cannot be avoided. Chicago is unique in history. Never has any other city grown so rapidly, and never has so much desire for the finer things of life developed so rapidly along with material success. Chicago values success in business, but it appreciates the fact that there are other things in life.

THE NEXT STORY OF THE UNITED STATES IS ON PAGE 7193.

Valdés.


Calderón.

Lope de Vega.

Camoëns.

Blasco Ibáñez.

Hurtado de Mendoza.

THE LITERATURE OF SPAIN AND PORTUGAL

CONTINUED FROM 7014

IT might be supposed that the two countries of Spain and Portugal, once leaders in the world's colonization, would be distinguished as centres of literature, but they do not fulfill such an expectation. Both countries have been prolific in books for a thousand years, except in periods of depression, yet only two individual writers stand out as great in a survey of the whole world's literature. On that scale Cervantes stands for Spain and Camoëns for Portugal.

From Spain, however, come two interesting collections of poetical and prose records of medieval romance, The Cid and Amadis of Gaul, which have a place in world literature. Later, in the days of her greatness, Spain produced two dramatists and poets, one of whom, Calderón, has achieved considerable European fame, and the other, Lope de Vega, is regarded by Spaniards as their greatest man of letters. Outside of The Cid, Amadis, Cervantes, Calderón, Vega and Camoëns, both Spain and Portugal have a literary story of only an average kind.

If we inquire into the reason why Spain has not a fuller literature with a wider influence, we find part of the answer in three facts. The country has always had serious divisions in territory and dialects, which have prevented complete concentration on the classical Castilian tongue, and long kept Latin alive as the language for serious writing. The first serious Spanish History, by Juan Mariana, finished in the early seventeenth century, was written in Latin, and only translated into Spanish. Again, Spain has always been a country where freedom of thought, with its frank expression in literature, was restricted—a state of things unfavorable to great literature. And, lastly, the Spanish language, by reason of its abounding rhymes, makes versifying extremely easy. The form of poetry, therefore, can be so readily achieved that there is a temptation to be satisfied without the choiceness in expression essential for true distinction.

As a part of the Roman Empire, Spain had great importance. Famous Roman rulers and writers were born there. Latin became so completely the language of the peninsula that, in all the centuries that followed, no invaders except the Moors ever introduced their language.

But when Imperial Rome lost her hold the country was divided by its sundering mountains into a number of kingdoms, each of which developed its own language from the Latin. Thus, by the time the Middle Ages were reached and romance was blossoming into literature, as in the legends of Arthur and Charlemagne farther north, Spain had formed at least three provincial languages from the old Latin foundation.

They were Galician, allied to Portuguese, in the northwest; Catalan, allied to the French dialect of Provence, in the north and east; and Castilian in the centre. In the south Arabic held such sway that there came a time, in the ninth century, when it seemed possible that it might eventually become the language of Spain. Averroës, the most famous of the Arabian philosophers, was born in Spain in 1126, when the Moors vied in civilization with the most advanced nations of Europe. It was not till the Moors had been thrust back farther south, and the Castilian tongue had gained a wider currency through the spread of the Poem of the Cid, the writing of national Chronicles under the supervision of Alphonso X (1252–84), and his publication of a national Code of Laws, that Spain approached unity of language.

THE MYSTERY WHICH SURROUNDS THE ORIGIN OF AMADIS

The Poem of the Cid, the Chronicles, and the Laws were the nucleus round which Spain gradually formed itself as a proud nation. Later the predominance of the Castilian tongue was strengthened by the fact that the most popular of all medieval romances in Spain, Amadis de Gaula, first gained wide currency in the Spanish of Castile.

When and where this famous romance of Amadis originated is an unsolved problem of literary history. It is firmly claimed by Portugal and by the allied dialect of Galician Spanish. It is clearly derived in subject from France. But in its first traceable published form it is written in Castilian Spanish. For centuries it was freely added to by unknown writers, who made up marvelous knightly adventures for the fabulous Amadis. The Spaniards were deeply in love with these unreal stories of chivalrous doings long after they had ceased to stir the northern races, and it was Cervantes who laughed them out of fashion in his Don Quixote. But Amadis, in its twelve books, contained some fine passages, and is the first substantial Spanish book.

We give you here a short extract which will enable you to judge somewhat of its style:

Not many years after the passion of our Redeemer, there was a Christian king in the lesser Britain, by name Garinter, who being in the law of truth, was of much devotion and good ways. This king had two daughters by a noble lady, his wife. The eldest was married to Languines, King of Scotland; she was called the Lady of the Garland, because her husband, taking great pleasure to behold her beautiful tresses, would have them covered only with a chaplet of flowers. Agrayes and Mabilia were their children, a knight and damsel of whom in this history much mention is made. Elisena, the other daughter, was far more beautiful, and although she had been demanded in marriage by many great princes, yet she would wed with none, but for her solitary and holy life was commonly called the Lost Devotee, because it was considered that for one of such rank, gifted with such beauty and sought in marriage by so many chiefs, this way of life was not fitting.

King Garinter, who was somewhat stricken in years, took delight in hunting. It happened one day, that having gone from his town of Alima to the chase, and being separated from his people, as he went along the forest saying his prayers, he saw to the left a brave battle of one knight against two. Soon had he knowledge of the twain, and that they were his own vassals, who being proud men and of powerful lineage, had often by their evil customs offended him. Who the third was he knew not, but not relying so much in the worth of the one as he feared the two, he drew aside and waited the event, which sorted to such effect, as by the hand of that one the others were both slain. This done, the stranger came towards the king, and seeing him alone, said, Gentle sir, what country is this wherein knights errant are thus assailed? The king replied, Marvel not at this, knight, for our country yields as others do, both good and bad: as for these men, they have often offended, even against their lord and king, who could do no justice upon them because of their kindred, and also because they harbored in this covered mountain. This king you speak of, replied the stranger, I come to seek him from a far land, and bring him tidings from a dear friend. If you know where he may be found, I pray you tell me. The king answered, Befall what may, I shall not fail to speak what is true. I am the king. The knight then loosing his shield and helmet, gave them to his squire, and went to embrace Garinter, saying that he was King Perion of Gaul, who had long desired to know him. Greatly were these kings contented that their meeting was in such a manner, and conferring together they took

their way through the wood towards the city, when suddenly a hart ran before them which had escaped the toils. They followed at full speed, thinking to kill it, but a lion, springing from a thicket before them, seized the hart, and having torn it open with its mighty claws, stood fiercely looking at the kings. Fierce as you are, said King Perion, you shall leave us a part of the game! and he took his arms and alighted from his horse, who being affrighted at the wild beast, would not go near him, and placing his shield before him, went towards the lion sword in hand. The lion left his prey and came against him; they closed, and Perion, at the moment when he was under the beast and in most danger, thrust his sword into his belly. When Garinter saw him fall, he said within himself, Not without cause is that knight famed to be the best in the world. Meanwhile their train came up, and then was their prey and venison laid on two horses and carried to the city.

The queen being advised of her guest, they found the palace richly adorned, and the tables covered. At the highest the kings seated themselves: at the other sate the queen with Elisena, her daughter, and there were they served, as in the house of such a man beseemed. Then being in that solace, as that princess was so beautiful and King Perion on his part equal, in that hour and point they so regarded each other, that her great modesty and holy life could not now avail, but that she was taken with great and incurable love; and the king in like manner, though till then his heart had been free, so that during the meal both the one and the other appeared absent in thought. When the tables were removed, the queen would depart to her chamber; Elisena rising dropt a ring from her lap, which she had taken off when she washed her hands, and in her confusion of mind forgotten. She stooped for it, and Perion who was near her stooped down also, so that their hands met, and he taking her hand prest it. She colored deeply and thanked the king for his service. "Ah, lady," said he, "it shall not be the last, for all my life shall be spent in your service."

The Cid is not a book, but rather a collection of ballads and romances which surround the largely legendary history of The Cid, the national hero of Spain, pictured by the imagination of later generations as the possessor of all knightly virtues. The earlier of these literary tributes to a fearless man have a fine, rough, poetic strength.

THE ROMANTIC KNIGHT WHOSE STORY IS TOLD IN TWO HUNDRED BALLADS

As a matter of fact, The Cid, whose name was Rodrigo Diaz de Bivar, a knight of the eleventh century, was a soldier of fortune who fought both against and for the Moors, according to his opinion of the treatment he received from the other side. He appeared with his band of free lances on many battlefields. Before he died, in 1099, he had ruled four years as a king in Valencia. His name The Cid (pronounced Theed in Spanish) is derived from the Arabic El Seid, meaning "the lord," and he is often called El Campeador (the Champion) because he overthrew in single combat the champion of the enemy. In Spanish poetry he is Cid Meo (My Lord), or Cid Campeador. Two hundred ballads tell his virtues, and to this day the Spanish people are roused to national fervor by his memory as it is preserved in legend and song.

The early literature of romance, prevalent in Spain in the fifteenth and sixteenth centuries, was accompanied by miracle plays, early forms of novel-writing and lyrical verse, mostly imitations from the Italian.

The first writer of regular drama, Lope de Rueda, was an actor; the first notable poets were Garcilaso de la Vega, Fernando de Herrera, and Luis Ponce de León, the great religious poet. The first historians were Juan de Mariana, a Jesuit priest, and Diego Hurtado de Mendoza, a statesman of the sixteenth century. The two last-named placed Spanish prose on a firm foundation.

THE POPULAR FICTION WHICH MADE A HERO OF A ROGUE

To Mendoza was attributed the novel Lazarillo de Tormes, which began the distinctive Spanish style of fiction known as picaresque; but later opinion denies him its credit or discredit. The picaresque novel is one which has a rogue for its hero. It was deliberately practiced in Spain, and attained its highest point of skill in France in Le Sage's Gil Blas. There are English specimens in Defoe's Colonel Jack and in Fielding's Jonathan Wild. It is not a form of fiction of which Spain may be proud.

Late in the sixteenth century and the earlier part of the seventeenth, Spanish literature reached its culmination in the works of Miguel de Cervantes and Lope de Vega.

THE FAMOUS SPANIARD WHO DIED ON THE DAY SHAKESPEARE DIED

Cervantes was born of an old Spanish family, in 1547, seventeen years before Shakespeare, and he died on the day Shakespeare died. He lived an active, adventurous life for a man who will

always be known through his writings. At twenty-one his first poems, on the death of the Spanish queen, were published. When he was twenty-four he was a soldier fighting in the great battle of Lepanto against the Turks, and was severely wounded. Later he served in Tunis and Italy. On his return he was captured off Marseilles by a squadron of Barbary pirates and taken as a prisoner and slave to Algiers. The pirates knew he was a man of importance, and though he repeatedly attempted to escape, his life was preserved, for his presence in Algiers was believed by the corsairs to prevent the town from being bombarded by the Spanish fleet. Finally, after five years of captivity, he was ransomed for five hundred gold ducats, and returned home to Spain.

Then he wrote a number of plays, but only two of them have been preserved. At this time he was writing for a living in imitation of Italian models, and not in the style natural to him. As writing did not afford him a living, he found employment in helping to provision the Invincible Armada, which was about to sail for the conquest of England. After the defeat of the Armada he sought in vain for service that would preserve him from a life of poverty, but apparently he was more than once imprisoned for debt or other money difficulties. During this period he was occasionally writing poems, for which he was ill qualified. But in 1605, when he was sixty years old, Don Quixote appeared and was instantly successful.

The style of this great book may be seen in the extract from it on page 1634.

CERVANTES IN HIS DYING HOURS WRITES THE DEDICATION OF HIS LAST BOOK

THE BOOK WHICH MADE CERVANTES IMMORTAL, BUT LEFT HIM POOR

Notwithstanding the popularity of his book, Cervantes remained poor, and apparently lived partly through the patronage of richer friends. He continued writing poems and plays with indifferent success, but his Exemplary Novels are notable books. He had promised to write a sequel to Don Quixote, but delayed until a sequel was published by an anonymous abusive writer who reviled the author of the immortal first part. Thus insulted, Cervantes concluded the book with a second part, even finer in its

humor and humanity than the first part. Six months later he died, and the place where his body rests remains unknown.

No book except the Bible has been more frequently translated into other languages, or has more completely sustained its reputation. Beyond any comparison it is the masterpiece of Spanish literature, yet Spain neglected its author almost as ungratefully as she neglected Columbus, who found a new world for her.

Don Quixote was written to make fun of the shams of chivalry that had become a thoroughly insincere fashion in Spain. As the author went on with his work it grew into a survey of the people who made up the Spanish nation, as they appeared to a man of humor and broad sympathy, seeing life from many points of view, with a mixture of sadness and amusement. There is no other book like it in the whole range of literature.

The famous man who wrote nearly two thousand plays

Lope de Vega, who lived from 1502 to 1635, was the successful contemporary of Cervantes, sometimes his enemy and sometimes his friend. He was the most prolific writer of plays that has ever lived in any country. It is known that he wrote two thousand plays, long and short, and more than four hundred are still in existence. Vega understood what the Spanish public needed in a play: they judged it by its power of producing continuous excitement.

He was a born master of plot-making, and so he was popular. He was fêted, rich, and had the world at his feet throughout a life that was far from admirable. He and Cervantes make one of the most glaring contrasts in all literature, judged by their contemporaries and their countrymen, and judged also by posterity and the world at large.

Lope de Vega not only wrote plays, often at the rate of an act a day, but he wrote everything that other men had written or were writing, with public appreciation. He hastened to challenge comparison with the Exemplary Novels of Cervantes by stories of his own, and as an epic poet he boldly entered the lists against Tasso. But his fame is that of a clever craftsman of plays to suit the Spanish temperament, setting a new standard of stagecraft in his country and of unrivaled industry in writing.

As a young man Vega fought in the Spanish Armada. In his old age he tried to redeem a dissolute life by becoming a priest and an officer of the Inquisition, and by giving his wealth to the Church and his body to self-torture. But for all his poverty the kindlier-natured Cervantes was the happier man of the two.

Pedro Calderón de la Barca, the Spanish dramatist who has obtained most celebrity abroad, belonged to the generation after Cervantes and Lope de Vega. He was sixteen when Cervantes died at sixty-eight, and thirty-five when Vega died at seventy-three.

Calderón's life was, except in morals, much the same as that of Vega. He served in youth as a soldier for ten years, according to his biographer, but this is doubtful. He had begun to write plays when he was a boy, and by the time his soldiering was ended he had gained such applause as a dramatist that when Lope de Vega died the king summoned the soldier to Madrid to be court master of amusements. Here he lived in high honor until he was fifty-one, when he entered the priesthood. But later he was recalled to the court as the king's chaplain, and he continued his writing of plays, chiefly religious. When he died, at eighty-one, he had a notable funeral, and his body now lies in the Spanish pantheon.

Though Calderón was a Spaniard through and through, imbued with the national ideas and writing to suit the national temperament, which loves an eloquence that is above all things showy, his writing has appealed more strongly to European taste than any other Spanish writer except Cervantes. He is recognized as an impressive poet as well as a skillful playwright. A considerable number of the 118 Calderón plays that are preserved have been reproduced in other countries in the form of adaptations, and, except Cervantes, no other Spanish writer has been so widely translated. Among his English translators have been Shelley, Archbishop Trench and Edward Fitzgerald, who sought to reproduce Calderón's effects in a free translation, true in spirit rather than in verbal exactness. A fine example of Calderón's form in tragedy is translated by Fitzgerald as The Mayor of Zalamea. The play was based on a sketch by Lope de Vega.

Other dramatists of note were Francisco de Zorrilla and Agustín Moreto.

After this time Spanish literature faded away into comparative insignificance, and it has only revived into a state worthy of notice in the modern fiction of Pereda, Valera, Galdós, Valdés and Vicente Blasco Ibáñez. Ibáñez was born in 1866. Many of his powerful stories have been translated into English.

The Catalan dialect has considerable literature which, however, does not reach the level of a Continental reputation. Its most striking poet in the distant past was a Valencian poet, Auzias March, and in modern times Jacinto Vadaguer, who died in 1902. But Catalan as a rival to Castilian Spanish has no future.

Portuguese literature, so far as the general world of books is concerned, is concentrated in Camoëns, the writer of its great epic poem, The Lusiads.

WHY THE LITERATURE OF PORTUGAL WAS WRITTEN MOSTLY IN SPANISH

Though Portugal puts forward the claim to have brought into the peninsula from France the original romance of Amadis, the fact is that the world received it from Spain. Indeed, until comparatively modern times the leading Portuguese wrote their books in Spanish, as it afforded the best outlet to European notice. Thus Jorge de Montemayor, the sixteenth-century prose writer, who started a European fashion in pastoral fiction by his pastoral romance Diana, used Spanish, and his book was published in Spain.

The literature of Portugal, always abundant, has been imitative. It has at various periods been derived from Provence, Castile, Italy and France; and Portugal stands before the world dependent on Camoëns as her natural interpreter. He made it the work of his life to be her historical interpreter.

Luis Vaz de Camoëns was of Spanish ancestry, but the family had been in Portugal for several generations. It was of noble origin but untitled, and Camoëns had the education of a gentleman. He was born in 1524, probably at Lisbon. He was educated at the University of Coimbra, where his uncle was chancellor. The youth must have been a very diligent student, for his great poem was written far away from books, and yet it contained a wide range of classical, historical and scientific knowledge. His poetry was at once recognized as being more masterly than anything yet known in his country, and he had reasonable hope of securing some suitable appointment. But it was not to be. Because of a duel arising from a love episode he was banished from Lisbon. His reply was a play which aggravated his offense, and, not expecting forgiveness, he went to North Africa as a soldier, lost an eye in a skirmish, and was disfigured for life.

THE EXILE WHO WROTE THE EPIC OF A PEOPLE

Returning to Lisbon, he joined a band of young ruffians who were always ready to draw their swords, and he boasted that he had seen the soles of the feet of many men running in retreat, but no one had seen his. Finally he wounded one of the palace servants and was imprisoned. He was eventually pardoned on the condition that he serve as a soldier in India, which was closely connected with Portugal by sea trade.

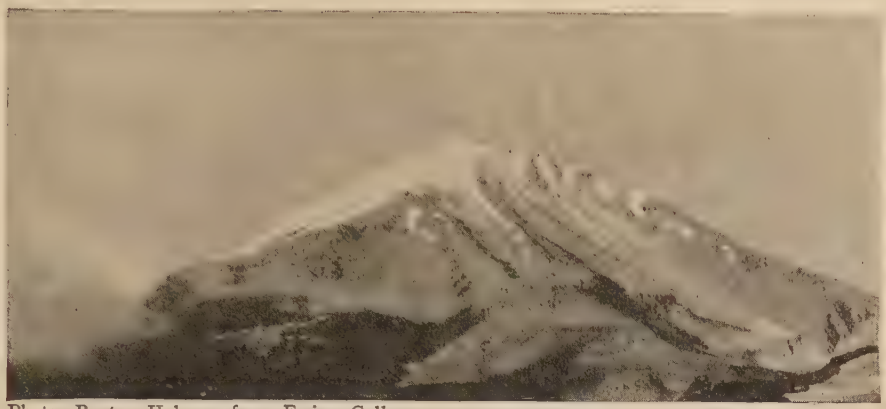
He sailed in 1553 and did not return for seventeen years. During those years, which he spent in travel, adventure and constant poverty, he wrote The Lusiads, which tells the story of Portuguese discovery in the East, and incidentally the story of the Portuguese nation. Not only is it the epic of a people, but the language in which it is written became established as the Portuguese national language. The judgment of the world has given Camoëns a place among the great poets because of the poetic beauty and classical grace of his language.

On his return to Europe Camoëns was pensioned by the Portuguese king because of his literary distinction and national service as a poet.

Camoëns died in Lisbon at the age of fifty-six, a victim of the plague, and was buried in the common grave which received the bodies of all who died of that terrible affliction. The monk who attended him in his last moments wrote: "What more grievous thing than to see so great a genius thus unfortunate. I saw him die in a hospital in Lisbon without a sheet to cover him."

Three hundred years afterward some bones that were supposed to be his were recovered and placed in the national pantheon. It was well, for no nation has gained greater distinction in literature from the writings of a single man than Portugal has from Camoëns, and his country was his theme.

THE END OF THE BOOK OF LITERATURE.



Photo, Burton Holmes, from Ewing Galloway.
Popocatepetl, or "Smoking Mountain," the great volcano of Mexico, which is 17,545 feet high.

MEXICO AND CENTRAL AMERICA

CONTINUED FROM 7104

Arms of Mexico.

SOUTH of the United States, but still a part of the continent of North America, lie Mexico and Central America—seven states in all—besides a bit of territory which is a part of the British Empire. Beyond them are the many countries of South America. All except Salvador are washed both by the Pacific and the Gulf of Mexico. That tiny country lies on the Pacific alone.

Let us look carefully at the shape of the gulf into which the "Father of Waters," the Mississippi, and the Great River of the North, the Rio Grande del Norte, pour the southern drainage of North America. The peninsula of Yucatan, which is a part of Mexico, and the peninsula of Florida shut it in like doors, and Cuba lies between them like a sentinel in the way.

Let us notice, too, the way in which the vast bulk of North America tapers through Mexico to Central America. Notice that there are four narrow isthmuses with bulging masses of land between them. The most important of the four are Tehuantepec, 125 miles across, and Panama, less than 50 miles across. Then let us think of the mighty mountain chain stretching, under different names, for thousands of miles, from Alaska in the Far North to the extreme tip of the pear-shaped southern continent of South America. There are many volcanoes in this long chain, especially about the middle of it, in Mexico and Central America. At Panama the great heights sink to about 3,000 feet, and the pass, or saddle, between these low mountains is less than 300 feet high. Through it the Panama Canal has been cut. To the west of the mountains lies the vast expanse of the Pacific Ocean, now joined to the eastern waters by the great canal.

Four hundred years ago no one could have given this simple description of the position of Mexico and Central America. Columbus died believing that the land he had discovered was part of Asia. By degrees his successors, cruising about the low-lying shores of the Gulf and the sea, caught glimpses of the ocean beyond. They sought in vain a way for their ships through the narrow neck of land to that ocean, until the truth came to them. They were not on the fringe of Asia, but on a great continent which lay between them and their desires.

How one envies them the first sight of the Pacific Ocean from Balboa!

THE GOLDEN LAND THAT LAY BEYOND THE WESTERN SEAS

Wonderful rumors, spread by these adventurous spirits, soon reached Cuba, one of the first islands settled by the Spaniards. There were stories of massive temples and great stone idols; of large towns with thousands of busy workers; of people with rich clothes and great possessions in gold and silver and jewels.

All these, they said, were to be found inland from the shores of the gulf. Daring deeds were daily occurrences in the sixteenth century, but one of the most romantic and desperate expeditions ever planned and carried out was that of the brilliant Spanish commander Cortes. He started out to test the truth of these rumors and to annex whatever he might find for Charles V, who was king of Spain as well as Holy Roman Emperor.

The stories we have of his forces do not all agree. We know that he set out from Cuba in ten or eleven ships in November, 1518, and that he had several hundred Spaniards with him. Some say that there were only 400, and some say there were nearly twice as many. He had a few horses and a few cannon. It was indeed a small force to conquer an empire.

Cortes did not land until March of the next year. The ships, the horsemen, the cannon made the natives think that the white men were gods. The town of Vera Cruz (True Cross) was founded.

THE WONDERS OF THE LAND TO WHICH CORTES LED HIS MEN

The story of a great empire inland made Cortes determine to take possession of its riches. He burned all his ships except one, so that the men could not think of deserting him. First he conquered a ruler near by and made an ally of him. Then with his few white men and many more natives he set out toward the city of Tenochtitlan, which we now call Mexico.

The way was hard, but the leader was determined, and brushed aside all difficulties. On and on the party toiled from the hot, unhealthy land by the sea, with its tangle of tropical vegetation, up the rugged country which leads by high terrace steps to the great plateau of Mexico, 7,000 feet and more above the level of the sea.

Montezuma II, the ruler of this fair country belonging to the Aztec tribe of Indians, had more than once sent presents and messages to Cortes, begging him to go away. But Cortes went steadily on till he reached the city of Tenochtitlan on the great lakes that lay in the midst of the plateau.

THE TERROR OF THE AZTECS WHEN THE WHITE MEN CAME

Like the Indians on the coast, the Aztecs were terrified at the pale faces of the Spaniards, at the horses and guns, none of which they had seen before. They seem almost to have believed that Cortes was the white war-god of their legends come back as he had promised centuries before, for the guns appeared to them to flash lightning, and the horses to travel like the wind. General Lewis Wallace's book The Fair God tells the story of this invasion.

It was not long before Cortes got Montezuma entirely into his power. It seemed as if all were about to be peaceably arranged for the transfer of the country and its government. Just then an Aztec general attacked some men whom Cortes had left at Vera Cruz and killed some of them. This showed that the Spaniards were not gods, and the people grew restless. Cortes had to return for a time to Vera Cruz, for a jealous official in Cuba had sent an army to punish Cortes for disobedience. Cortes defeated the army and enlisted the soldiers in his own army. While he was gone the people rebelled against Montezuma and the Spaniards. Cortes returned only just in time to save his forces from utter destruction.

Montezuma, a prisoner, was persuaded by the Spaniards to speak to his subjects and urge them not to attack the strangers. An impressive sight he must have been standing on the flat roof of the palace, dressed in his blue and white mantle, his blazing jewels, fine crown and golden sandals dazzling in the sun! But the furious people, refusing to listen longer, flung arrows and stones in a great tumult. Montezuma — their king — was fatally wounded during this encounter. The day after his death, when things looked black indeed for the Spaniards, Cortes cut his way out of the capital in the darkness. This was known as the "sad night." Men and horses perished on the narrow path by the waters of the canal and lake, and when the remnant gathered together in

the country beyond, Cortes wept tears of despair.

But the genius of the leader shone only the brighter for this check. Somehow he managed to rally his forces, and within a week he utterly defeated the brave Aztecs who came out to withstand him. They fled in confusion, more than ever convinced that he must be a god and not a mere man. This was July 7, 1520. The next year, by means of help from neighboring tribes, and by unheard-of efforts in organizing an army and arranging for its supplies, the beautiful plateau of Mexico, with its ruined capital, Tenochtitlan, fell under the power of Cortes. When the town rose again by the lake it was as the city of Mexico.

The country was put under military rule for a while, and became part of the huge dominions which so oppressed the weary emperor Charles V. Cortes was not content with these successes. He made many explorations in Central America, always hoping to find a way through to the Pacific.

More colonies for Spain were founded, in Yucatan and Honduras and in other parts of the land, whose secrets were revealed by the energy of the great commander and his officers. Cortes even pushed up the long narrow Gulf of California, and before long the Spaniards had also found their way far beyond the plateau of Mexico in all directions. Cortes himself was badly treated by Charles V, and died in Spain alone and almost forgotten.

The history of the peoples whom the Spaniards found in Mexico and Central America has not yet been fully unraveled. Scholars are still at work studying the wonderful ruins of temples that are discovered from time to time, the carvings on great stone idols and altars, and the picture-writing on various relics. Some of these we can see for ourselves in museums. It is interesting to trace resemblances in them to the work of other countries, such as Egypt, Babylonia and China.

Mexico and Central America, the link that joins two great continents.

THE MYSTERY OF THE FIRST PEOPLE WHO SETTLED IN AMERICA

Where the first people came from to settle in America we do not know, but the remains found in the soil show that through the long centuries before the vast lands were discovered by Europeans, different races of people had lived and died on them for generation after generation. Sometimes these men destroyed the works of those who had gone before them; some-

times they grafted their own works upon those of their predecessors.

The first people around the city of Mexico that we know anything about were the Toltecs, who seem to have ruled about three hundred years. It was about 1064 that they were defeated and driven south by the Chichimacs, who built cities and lived in them. Next come seven tribes of the Nahua stock. The Aztecs were one of these tribes and finally gained control over the others.

Farther south, in Yucatan, Honduras, Guatemala and other states, the Mayas lived. They were great builders, and the ruins of some of their houses can be found to-day. They had a written language, and by good luck some of their books yet remain. When Cortes went to Honduras he passed, all unknowingly, a wonderful palace of the Mayas, hidden by the thick growth of trees and shrubs.

The civilization of the Aztecs was remarkable in many ways. They were not as good builders as the Mayas, but some of their palaces and temples were very large. They did not know iron, but their workmen did wonderful work in gold, silver, copper and tin. They used a system of picture-writing, and had large schools. They learned the use of cotton and wove cloth of it.

THE GREAT ZEAL OF THE SPANIARDS TO CONVERT THE HEATHEN AZTECS

As we know, the Spaniards classed the natives they found in the New World all together under the mistaken name of Indians. The civilization and conversion to the Christian faith of these so-called Indians was one of the chief objects of the Spanish conquerors. Bands of devoted missionaries went out from Europe to the new possessions to persuade the natives to give up their wild, roving life and the heathen customs of their religion such as offering human sacrifices to idols.

Cortes himself did his best to persuade Montezuma to accept Christianity, but the Aztec chief was only puzzled by the new ideas so hastily thrust upon him. In the first zeal of overthrowing heathenism, everywhere idols and temples, inscriptions and carvings were cast down, buried, defaced; so that the task of finding out the truth about the past has been made even harder than it might have been. Enough has been saved, however, to enable scholars to tell us a great deal about the Aztecs and their beliefs.

THE SPANISH GOVERNMENT OF NEW SPAIN

Soon after the news of Cortes' discoveries reached Spain people began to come out, but the actual number of white men in any of the Spanish colonies was never large.

As the years passed on, the native races settled down, after many difficulties, to the new religion and new rulers. The new teaching seemed very strange to the simple-minded Indians, and the priests had much difficulty in explaining the Christian religion to them. Their task was made harder by the reckless searchers for gold, many of whom were cruel and selfish and did not regard the rights of the Indians.

Mexico, together with Central America and the West Indies, was called "New Spain." It was ruled by a viceroy who in almost all cases was sent out from Spain. Between 1535, when the first viceroy was appointed, and 1821, when Mexico gained its independence, there were more than sixty of them, and only two or three had been born in Mexico.

Many beautiful towns were founded, built after Spanish models and supplied with Spanish names; and fine cathedrals, schools and colleges rose up in them, and Spanish families went out to make new homes in the Far West. Roads and bridges made travel and trade easier. As agriculture was extended and improved by the teaching of the priests, mining was developed, and the raising of cattle then became an important industry. Great tracts of land were given to favorites. Sometimes a man could ride all day on his own land.

Both Mexico and Central America still offer vast possibilities in all these directions. Round the tropical lowlands rice, sugar, cocoa and cotton grow easily. On the rising terraces coffee, maize and tobacco find suitable conditions, and wheat-fields lead up to the grassy hills, which make good pasture land for the cattle and the splendid horses for which the country gradually became famous as the years went by.

THE VAST NATURAL RICHES FOUND IN THE FORESTS AND MINES

The magnificent forests abound with every valuable kind of tree, from the rubber tree to the mahogany. As for the mines, Mexico is rich in various kinds of metal—silver, gold, copper and lead,

MEXICO CITY AND ITS MONUMENTS

A PANORAMA OF MEXICO CITY, FROM THE CATHEDRAL TOWER

PLAZA DE LA CONSTITUCION, IN THE BACKGROUND THE CATHEDRAL

STATUE OF CUITLAHUAC IN THE GLORIETA DEL PASEO DE LA REFORMA

among many others. Sulphur is obtained from the crater of the smoking mountain Popocatepetl. Another remarkable volcano is Jorullo, thrown up by an earthquake in a single night in 1759 from fertile fields of sugar and indigo.

The Indians did not like to work; and some negro slaves were brought in, but not in great numbers, for the climate did not suit them.

In time many Spaniards intermarried with the natives, particularly in Central America; and so a large mixed nation has grown up, with a certain number of pure-blooded Spaniards at the top of society and many natives "of no account" at the bottom. Even the great men of these countries are often descended from the conquered as well as from the conquerors. New Spain gradually came to include nearly all the country round the Gulf of Mexico, and reached out northward to California, though the outlying districts were very thinly peopled.

Spain always needed all she could get out of her distant provinces, for her wars at home were constant in the seventeenth and eighteenth centuries. Under some viceroys the taxes were excessive, and the people were oppressed in order to send riches to Spain; but under other viceroys the rule was milder and sometimes even indulgent.

How Hidalgo began the struggle that ended in Mexico's freedom

As time went on the white men born in Mexico thought it wrong that all the high offices should be held by men born in Spain. They had heard, too, of the American Revolution and of the French Revolution, and some determined to be free. When Napoleon made his brother Joseph king of Spain the officers did not know which king to follow. In 1810 Hidalgo, a parish priest, started a rebellion, but it was put down and the heads of Hidalgo and the other leaders were cut off. Another priest, a pupil of Hidalgo, named Morelos, then raised another rebellion, but he, too, was captured and was executed in 1815.

The sad end of the heroes who tried to set Mexico free

The people who lived in those times no doubt thought Hidalgo and Morelos had failed. We who live more than a hundred years later know that they succeeded gloriously in awaking their countrymen and prepared the ground for the great struggle that was coming. To-day they are honored in Mexico, and a state has been named in memory of each of them.

But the idea of independence was not dead. The fighting continued, and all began to feel that separation was sure to come. Finally Vicente Guerrero, the chief of the rebels, and Iturbide, a Royalist general, met with the new viceroy, and they agreed that Mexico should be independent under a king from Europe. No one would consent to take the throne, and so Iturbide had himself proclaimed emperor in 1822. As the people refused to accept him, he resigned the next year. In 1824 the Republic of Mexico was set up.

Iturbide, who was the son of a Spanish nobleman, had been ordered to live abroad, but some of his friends persuaded him to return to Mexico, saying that the people really wanted him to be emperor. When he reached Mexico he was arrested and shot. In later years the Mexican people came to see that though he had been ambitious, he was really the man who had freed Mexico from Spain, and now he is called the "Liberator of Mexico."

A time of war and confusion

The new republic had a hard time. The people had never had the opportunity to learn how to govern themselves, and there was little peace or order. Ambitious men struggled to become the head of the new state, and there was constant fighting. The man who won the presidency seldom could hold his place for even as long as a year. Some of the rulers called themselves dictators, but their power did not last either.

The most powerful man in all the period of confusion was Antonio López de Santa Anna, who was sometimes on one side and sometimes on the other, but always for himself. He gained fame by driving out a Spanish army which was trying to put Mexico back under Spanish rule. In 1833 he became president for the first time, just when the question about Texas had to be met. For it was about this time that troubles began with Texas, on the Gulf of Mexico. No one was at all certain about the boundaries of Texas. Some said it was really a part of the Louisiana Purchase, and so belonged to the United States, but it was generally thought to be a part of Mexico. When

THE LAKE IN THE FOREST OF CHAPULTEPEC

THE OLD PRISON, VERA CRUZ

THE RUINS OF MITLA

A MINING CENTRE SET AMONG THE MOUNTAINS

Guanajuato, of which we see a general view in this picture, is a great mining capital, and is situated on both sides of a deep ravine with a mountain stream running through it which in rainy weather becomes a torrent. The narrow twisting streets rise steeply as they follow the ravine up to the mining villages clustered about the opening of the mines in the hillsides. In the centre is the city, with substantial old Spanish buildings and busy commercial life.

Photos, Hugo Brehme; that of Ruins of Mitla, copyrighted.

Mexico began to fight for her independence only a few white traders, missionaries and hunters lived in Texas. A little later three hundred families went from Mexico to colonize it, and a large number of Americans also settled there on grants of land. More and more Americans came, until the rulers of Mexico became frightened and forbade any more to come in. An insurrection against the oppressive Mexican Government broke out. It ended in the Texans' becoming independent in 1836. Santa Anna was captured, and agreed to do all he could to make Texas independent. In spite of this the Mexicans made three attempts to conquer the new republic. Finally, in 1845, the United States listened to the request of Texas to make it a state of the Union.

THE WAR BETWEEN MEXICO AND THE UNITED STATES ABOUT TEXAS

We remember that many people in the United States were against this union because the laws of Texas allowed slavery; also many people in the United States thought a war with Mexico would follow if Texas were annexed, as Mexico had never given up hope of reconquering the new republic. These opponents were soon seen to be right, and Mexico and the United States were presently at war.

The Mexican War did not last very long. The American troops were well armed and disciplined, and fought steadily. The Mexicans were very brave, but they were badly led. During the two years of war twelve different men tried to rule in Mexico. You can see that with such frequent changes in the government the generals would not know what to do. The Americans were victorious in every battle. Vera Cruz was taken; beautiful Pueblo, with its many-colored tiles glittering in the sun, fell without a blow; even Mexico, the capital, was occupied, after the hill of Chapultepec, so connected with old Mexican history, had been taken as the result of a terrific struggle.

After peace had come to the long-distracted country there was a short interval of quiet, when reforms were beginning to take effect; then troubles came again. President Juarez saw that the state of the country was so bad that it could not pay its debts at that time. He was not very polite about it, and offended the European nations which held the most of the debts. Three of them sent armed forces to protect their rights, they said. England and Spain soon withdrew their remonstrances. But Napoleon III, wishing for military glory, managed to set up a European prince, Maximilian of Austria, brother of the emperor Francis Joseph, as emperor of Mexico, with promise of support from the arms of France.

Maximilian's reign of three years is indeed a tragic story. With his young and charming wife he set up a gay court in the beautiful palace, restored and furnished in grand style, on the famous hill of Chapultepec. The National Museum in the city close by holds the heavy silver plate, the great glass coach, and many other gorgeous reminders of the brilliant days that passed like a dream, with dinners and dances, and fêtes under the fine trees and among the wealth of sweet roses. On Maximilian's entry the native president Juarez withdrew to the north of Mexico, and bided his time. Suddenly there came a crash. While Napoleon was making his schemes the United States had been occupied with the Civil War. As soon as that was ended, however, the United States hastened to remind France that the countries of Europe had no right to interfere with the nations of the American continent, and that the United States could not recognize a monarchy in Mexico. Napoleon, fearing to risk a war with the United States, was compelled to withdraw the help in money and soldiers which had been promised to Maximilian in order to keep him on the throne that he had been persuaded to accept.

AN EMPRESS LOST HER REASON, AND AN EMPEROR HIS THRONE

The poor empress Carlotta rushed off to Europe to try personal pleading with Napoleon and with the pope, but she could not accomplish anything. The strain and sorrow sent her out of her mind, and she never recovered, though she lived to be very old. Maximilian refused to give up the throne or to leave the country. He was taken prisoner and shot.

As the French departed, and the empire they had created drew to its tragic end, one of the greatest of Mexican rulers was making his way to the front. This was General Porfirio Diaz, who took possession of the capital for the Liberals in 1867. Less than a month later the patient, long-enduring Juarez entered it in solemn state and held the presidency until his death, in 1872. Four years after the death of Juarez, Santa Anna died, poor, blind

PUBLIC BUILDINGS AND MONUMENTS

THE GOVERNOR'S PALACE, MEXICO CITY

STATUE OF CRISTOBAL COLON

THE POST OFFICE BUILDING

and neglected. Though possessing great bravery and military skill, he had always been turbulent and difficult, and often had done his country harm instead of good.

A PRESIDENT WHO HAD MORE POWER THAN A KING

After Juarez's death Sebastian Lerdo de Tejada served as president and determined to continue in office a second term, though this was against the law. A revolution broke out, and he was defeated by General Diaz, who was elected president in 1877. At the end of his term a friend was elected, and in 1884 Diaz again became president. Later the law was changed to allow re-election. Diaz continued to serve until 1911, when he was forced to resign. Though called a president, he was really a dictator.

Diaz kept order, and the wealth of Mexico increased greatly under his rule. Railways and manufacturing were encouraged, new public buildings were constructed, and the harbors were improved. Many men of other nations went to Mexico to develop the riches of the country, and all seemed well with the nation. President Diaz made two great mistakes. He decided everything himself and did not train other men to take the government when he grew too old, and he did not try to have the poor people educated. Though he had much Indian blood in his veins, he did not do much for the Indians.

Mexico grew richer, but most of the wealth was held by a very few people. The greater part of the population could neither read nor write, and had no property at all except the clothes they wore. They worked on the land or in the mines, and were nearly all in debt. They could not move to find better work until the debts were paid, and the wages were so small that this was often impossible. Sometimes they were cheated by their employers to prevent them from getting free.

REBELLION IS RAISED AGAINST PRESIDENT DIAZ AT LAST

In 1910 a wealthy man, Francisco Madero, who felt that all this was wrong, was a candidate for the presidency. Just before the election he was arrested, and of course Diaz was re-elected. When Madero was freed he planned a revolt, and soon the north of Mexico was ablaze. The revolution continued to spread, and in 1911 Diaz resigned and went to Europe, where he lived until his death, in 1915. Madero went to Mexico City, and when the election was held he was chosen president.

When the iron hand of President Diaz was removed disorder broke out. President Madero was not strong enough to govern, and soon there were three or four men with armies all trying to seize the power. In 1913 revolt against Madero broke out in Mexico City under Felix Diaz, a nephew of the old president, and General Reyes. The commander of the army, General Victoriano Huerta, went over to the rebels, and both Madero and the vice-president were murdered.

Soon General Huerta was chosen president, but the United States would not acknowledge him to be the rightful ruler. A revolt against him broke out in the north of Mexico, and there was bitter fighting. Both sides sometimes took the property and even the lives of American citizens living in Mexico, and President Wilson warned them that the United States might have to interfere. In 1914 an American force was landed at Vera Cruz, and General Huerta was compelled to resign.

THE UNHAPPY CONDITION OF MEXICO CONTINUES

General Venustiano Carranza, the chief of the largest force of revolutionists, now took charge of the government, but he quarreled with General Villa, who was his best soldier, and there was more fighting. For a time four men claimed to control the government. The United States withdrew its ships from Vera Cruz, but later soldiers were sent from the Texas border into the country in unsuccessful pursuit of bandits, and remained for some time. General Carranza finally brought most of the revolutionary bands under partial control, but he was assassinated in 1920 before the end of his term.

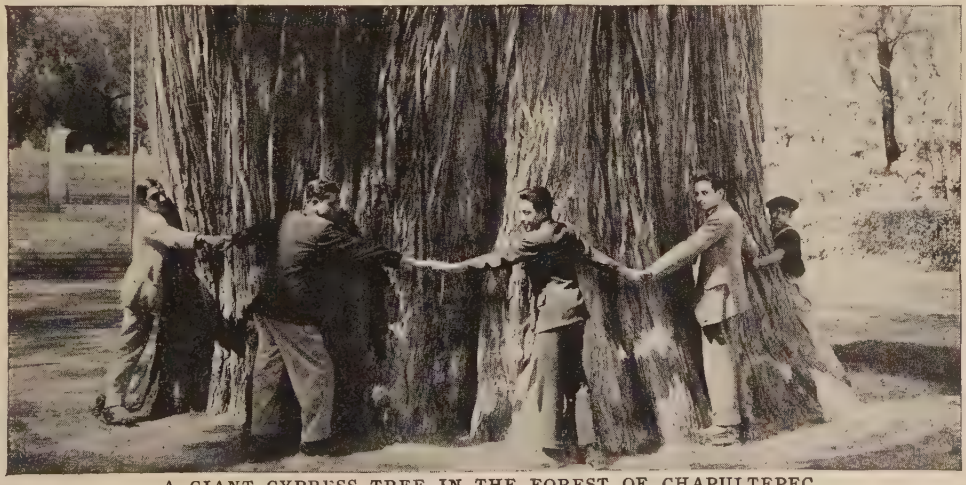
At the elections held after his death General Alvaro Obregon, a prominent revolutionary leader, was chosen, and he took office at the beginning of 1921. His government was not recognized by the United States until the fall of 1923, and shortly after that five Mexican states rose in rebellion. They were led by the presidential candidate of the party opposing Obregon's choice for his successor in the elections of 1924. During the summer before, Villa had been shot and killed—an early victim of election plots. Obregon

SCENES IN MEXICO

THE CANAL OF XOCHIMILCO

TEHUANTEPEC INDIANS

WATER-CARRIERS



A GIANT CYPRESS TREE IN THE FOREST OF CHAPULTEPEC

not only finished his four-year term, but handed the reins over peacefully to his successor, General Plutarco Elias Calles, in November, 1924—a feat accomplished only once before in Mexican history.

WHAT OF THE TERRITORY SOUTH OF MEXICO?

South of Mexico are six little states and a British colony, which are all together known as Central America. Columbus touched this land in 1502, and soon afterward Spaniards came to conquer the territory. Before the work was done Cortes had already conquered Mexico and worried and subdued the Indians. For a time all the country was a part of New Spain, but afterward was independent of the Mexican viceroy, and was governed by the captain general of Guatemala. It was divided into five departments, which have since become the states of Guatemala, Honduras, Salvador, Nicaragua and Costa Rica. British Honduras is a part of the British Empire.

The Spanish rulers were generally very bad, and tried to enslave the Indians, who were very stubborn. So few white women came out that the Spaniards soon intermarried with the Indians. Most of the population is now mixed white and Indian, or pure Indian, though there is some negro blood in some of the states.

The country declared its independence of Spain in 1821, and was united to Mexico under the emperor Iturbide. When he fell, the Republic of the United States of Central America was formed. It lasted until 1839, when it fell apart into the states we have mentioned. Since that time there have been many attempts to restore the union, but one or more states have always objected, and a complete union has never been formed. There has been war nearly all the time, except in Costa Rica. This republic, which someone calls "an oasis of progress," has a larger proportion of whites than the others, and has been quieter. Most of the others have spent much time fighting one another or having revolutions at home. Like their South American neighbors, these little republics have often had dictators in control of their affairs. In Guatemala, for instance, one man managed to keep the government in his own hands for twenty years.

There were only five Central American states until 1904, when Panama became the sixth. The isthmus was joined to the Republic of Colombia in 1821, but had been very restless, and at times was almost independent. In 1903 it revolted because it feared that Colombia would prevent the digging of the Panama Canal, of which you can read on page 361. Panama stretches from Costa Rica to the mainland of South America, but the Canal Zone, through which the Panama Canal runs, cuts the country in two.

SOMETHING ABOUT THESE STATES OF CENTRAL AMERICA

Now let us take a look at these states. Two are about the size of New York, one the size of Vermont and New Hampshire together, while tiny Salvador is not so large as New Jersey. Panama and Costa Rica cannot agree about their boundaries, and so one cannot say exactly how large either of them is. In no one of the states is the population as great as that of Virginia.

The climate is varied. It is hot in the lowlands near the coast, cool higher up in the hills, and really cold among the mountain-tops. There is a rainy season, during which there is a shower nearly every day. A great deal of rain falls in the region, sometimes as much as 200 inches in a year. Much of the soil is very fertile. Almost everything will grow, and some plants yield two crops in a year. Cotton, corn, sugar, rice, tobacco, coffee and cocoa, besides nearly all the common vegetables, are grown. Bananas, pineapples, guavas and many other fruits grow. There are forests of mahogany, cedar, rosewood, rubber, logwood and many other valuable trees. Some of our valuable medicines come from Central America. There are wonderful flowers.

THE BRIGHTLY COLORED BIRDS OF THE TROPICAL FORESTS

Hosts of birds, many with bright plumage, live in the forests. Costa Rica has more species of birds than all Europe—among them various kinds of parrots and macaws, and the curious quetzal, hunted for its tail feathers. In some parts huge vampire bats force the people to keep indoors at night and to protect their animals. There are jaguars, and others of the Cat Family, besides many queer animals, such as the honey-bear, the armadillo, the tapir and several kinds of wild pigs. Much territory has never been explored by white men. Central America could support a much larger population.

THE NEXT STORY OF ALL COUNTRIES IS ON PAGE 7155.

Earthworms and their casts.

THE WONDERFUL EARTHWORM

CONTINUED FROM 7069

WHAT an unmerited reputation for evil the worm has had to live down! If any creature was evil, men called it a worm, and posterity asked for no further evidence of its villainy.

Forty times and more Shakespeare slanders this poor tenant of the earth as the worker of mischief, or as the symbol of misdoing and fatal melancholy. Vile worm, poor worm, viperous worm, gnawing worm, eyeless venomed worm, worm of the Nile (which means a snake), there is no goodness in the worm, the worm is not to be trusted—so runs the master's pen.

Shakespeare was clear-eyed and accurate in all things he observed at first hand, but he took the worm's character at second hand, and lo, it was very bad. The standard books on natural history available to him asserted that worms "be full evil and malicious; some be footless, and some have six feet and be enemies to mankind."

Yet out of the very wickedness of worms men were to distil antitoxins against "shrinking of sinews and biting of serpents and scorpions." Also, if the armorer stamped upon worms, strained them through cloth, then added an equal quantity of oil of radish-roots, and used the mixture in the making of swords or daggers, "the same shall cut through iron after, as though it were lead."

"If I but *see* a worm, I have no appetite for the next three days," said a lady once, not realizing that but for worms there would be little food to satisfy her appetite. How does that boneless, limbless creature, the earthworm, discharge its great service to the earth, to vegetation, and so to all animals and to ourselves who depend on them? It is a living mill, grinding up soil day and night, reducing the mountains of other eras, with the verdure and carrion of yesterday, to the fine compost from which all plant life springs and grows.

The body of the earthworm is segmented, ringed throughout, and through the interior of its long body runs the astonishing digestive system. The thin, pointed end of the earthworm is the head, bearing the mouth, which has neither jaws nor teeth, but a lip for grasping. A muscular sac, called the pharynx, leading to the gullet, or food-canal, supplies suction to aid in taking in food. The matter eaten, as it passes down the gullet, comes in contact with glands, not found in any other animal, which secrete a large quantity of carbonate

of lime and aid in the breaking-down process by which the food is reduced to digestibility.

From the crop to the gizzard the meal progresses, and, arrived in this powerful mill, it undergoes a grinding similar to that to which the food of a bird is subject. In the gizzard, as we should expect, are numerous small stones, varying between one-twentieth and one-tenth of an inch in diameter. Many small stones must be swallowed with the earthy material absorbed in the ordinary act of feeding, but a battery of stones is maintained here just for the purpose of grinding; they are, in fact, the millstones of the miller of the soil.

Having been revolved and ground in the gizzard, the food passes on into the long food-canal beyond. When all nutriment which can be extracted has been obtained, the residue passes on and is expelled from the earthworm's body, and issues from the opening of its burrow in what we all know as wormcasts.

The earthworm has no eyes, but it has quick-acting sense organs. It can detect the difference between light and dark. It never shows itself in bright daylight unless it is frightened from its hole, or unless it is sick and ailing, or threatened by the flooding of its dwelling.

How the Earthworm Prepares for Its Future Generations

With no nose, it can smell; with no ears, it can detect vibrations. It breathes through its skin; it feels heat and cold; it is keenly sensitive to touch; it displays a decided sense of taste in the choice of its food, showing preferences for various types of vegetation over other kinds, choosing the fat of flesh before the lean, and liking fresh meat better than foul, though not disdaining to eat the bodies of its dead kind. The thickened ring of color lighter than the rest of the body near the head is not, as may be supposed, the scar of an injury; it marks the presence of a gland from which is poured out the fluid composing the cocoon in which the eggs of the earthworm are laid.

Eggs so laid produce little earthworms resembling their parents in all but size; there is none of the wonderful changes of form such as mark the career of the insects. It is not true that if we cut an earthworm in half and apply the head to the tail, the two parts will unite, though many people believe it. It is true, however, that if an earthworm is halved, the head portion will produce a new tail, but, strange to say, the tail portion will also produce a tail, and not a head as we should expect, unless the cut is less than eighteen or twenty segments from the head.

The Remarkable Body of an Earthworm and Its Burrowing-Power

The powerful cylindrical body of the worm is ideally fitted for burrowing. Its muscles endow it with thrust, and bristly appendages springing from the segments like microscopic claws increase its power of locomotion. But the worm does not butt its way through the soil. It eats as it goes, swallowing the earth particles with their contained nutriment; and the head, obstructed by a stone, finds a way round. There are few obstacles too difficult for its passage.

By absorbing the soil the earthworm has a less difficult task than many animals whose ways we have followed, which have to throw out the matter which they have excavated while burrowing through the soil. The ordinary burrow runs from a foot to a foot and a half in depth, though to escape frost or flood the earthworm goes far deeper, and exceptional burrows have been found between five and six feet in depth. In many directions it tunnels, but, let us remember, it cannot do this without eating the soil. The soil itself is heavily charged with vegetable and mineral débris, and it is this which the earthworm extracts during the complicated process of digestion.

No matter how deep the earthworm goes, the process is always the same—the soil must be eaten before it can be cast out of the burrow. So the earth in which it works is continually being brought up to the surface, exposed to the air, freshened, fertilized by the absorption of atmospheric gases, and receiving new deposits of organic matter to increase its fertility.

Now, as the earth which has been eaten is expelled from the end of the earthworm's body, and the wormcast is always brought to the surface, how can the earthworm manage to turn round in its almost straight cylindrical shaft? Turn it must, for we know that the normal attitude of the animal is head uppermost. We have but to go out on to the lawn with a lantern on a warm, dark evening to see the grass covered with earthworms.

Rarely, however, do we find an earthworm free of its burrow. The tail end remains within the shaft, and a flash of direct light or the vibration caused by a footstep sends the earthworm down into its hole with amazing swiftness. Its retreat has been likened to the withdrawal of a tortoise's head into its shell.

Earthworms do roam about the surface; their tracks can be followed in many directions, but they are found mostly in the position indicated—heads out, tails at home. How, then, do they perform this marvelous somersault which enables them to bring the soil to the surface—how do they turn upside down in their tube?

The probability is that at the lower end of their perpendicular shafts they nearly always have a more open chamber in the earth in which to turn. Such chambers have repeatedly been found, lined with stones of minute size, with seeds and other smooth substances. They have been regarded as the retreats of the earthworm from great cold and equally deadly drought, but they must, one would think, serve this other necessary purpose.

Whatever the method, the turn is performed, and out into the open comes the eaten soil, as fine as these living grinding mills can make it. Not quite all of it is thus thrown out, however; a little re-

Polygordius, a segmented worm.

Magnified sections of Liver flukes.

Tomopteris Marine Worm.

The beaked Nais.

A Bristleworm and its eggs.

The Sea-mouse, a marine worm common round our coasts.

Chætopterus, a marine phosphorescent worm.

The Rock Leech.

Myrianida, a sea-worm.

RELATIVES OF OUR FRIEND THE COMMON EARTHWORM

mains in the shafts. The earthworm is a comfort-loving creature. It cannot bear a rough surface to its tunnel-lining.

THE LITTLE UNDERGROUND TUNNEL WITH ITS LINING OF CEMENT

To avoid this it lines the burrow with a cement of fluid mud, adding here and there smooth particles of stone and glass or whatever may be found on the surface, with tiny pieces of leaves and other vegetation, and smoothing all with a covering of moistened soil. As this hardens it becomes quite polished by the movement of the earthworm up and down, and so allows that swift withdrawal into the hole which we have noted.

In addition to eating earth, the earthworm feeds on dead leaves, fallen blossoms, seeds and other vegetable substances lying near the mouth of its burrow. It draws the leaves down its hole in such a manner that the small end always goes first, so taking the line of least resistance. Many of these leaves and other substances it eats; many, or parts of many, it leaves to decay and form new material for the regeneration of the soil.

THE LOWLY EARTHWORM AND THE WORK IT HAS DONE FOR MAN

There we have two valuable processes, the bringing-up of old soil to the surface and the addition of leaves and other substances to the soil. In addition to this the earthworm is constantly opening out channels in the earth which allow air and moisture to enter, thus preventing it from caking and becoming non-porous.

Moisture comes through into these little canals; it penetrates through their walls and so affords a wide distribution of the dampness necessary to plant life. All these perforations and dampings of the soil open up ways for the germination of seeds, for the spread of the tender root-hairs of plants which, in hard, unbroken soil, would only with difficulty make their way about to find nourishment for the growths they feed.

Up above, the wormcasts are blown by the wind or in other ways broken down, and so are carried through cracks and little channels down into the soil again as rain falls and makes its way into the earth. The earthworm's quest for food and homes has the effect of mixing soil and vegetation and animal remains into an ever-increasing mass of vegetable mold which becomes the seed-bed of the richest plant life.

It is reckoned that there are about fifty thousand earthworms to an acre of land, and that they raise from fourteen to eighteen tons of soil to the surface every year, adding an inch a year in this way to the depth of the vegetable mold.

In temperate climates they burrow deep to escape frost and drought, as we have seen. When frost or drought come they must send fifty thousand earthworms an acre burrowing down three, four and five feet deep, three or four times a year, each descent being achieved only by eating and bringing up the soil excavated.

THE RICH BLACK SOIL WHICH PRODUCES THE WORLD'S BEST WHEAT

The consequence is that air and moisture reach down far deeper than plow or spade, and wherever air and moisture go the soil is enriched and fertilized. How many earthworms must have worked for ages to give Manitoba her matchless area of rich black mold! No other agency but earthworms can have done it, and Manitoba should give its earthworms a monument.

It is not only in temperate climates that earthworms are at work. They are scattered all over the world. Some of the earthworms of tropical countries are quite alarming in their dimensions—five feet long and of prodigious girth. If our little worker worms bring up their twenty ounces of soil per annum, how much more will these giants pass through their bodies for the ultimate benefit of agriculture, or even a natural wild growth!

HOW THE EARTHWORMS HAVE RECLAIMED THE WAR-RAVAGED LAND

During the World War certain parts of Belgium were so long flooded and other parts so ravaged by the mechanism of conflict that it was doubted if these parts would be of service again for the purpose of agriculture within our own lifetime. But great areas, practically all that was flooded and much more besides, are again yielding crops, thanks to the work of the earthworms which have returned to their old haunts, have burrowed and tunneled, sweetened and fertilized, and prepared the way once more for the arts of man.

Vast tracts of land have been left to lie waste in the United States where careless farmers took out of the land more than they put in; they reaped and harvested, without manuring the land, till it became sterile. Then they moved on to fresh land. The earthworms will have

to restore that exhausted soil, and in time they will.

It has been noted that in certain districts of Africa the natives look for wormcasts as the Indians used to look for the trail of men and animals. Where wormcasts are plentiful these skilled sons of the wilds settle for brief cultivation, knowing that they will secure a harvest for their labors. Where wormcasts are few they do not attempt to grow crops.

THE CHANGING FACE OF THE LAND THROUGHOUT THE CENTURIES

There is another important part played by earthworms. They may cause the stones on a field to sink into the earth. They preserve the sites of ancient buildings. Beneath the deep foundations of great pillars and columns they may not be able to penetrate, but beneath the floors, where cement and concrete decay and crack, they can work. And it is there that they dwell, devouring the soil and casting it up between the cracks, so that in the course of time the dried and scattered casts cover the floors, rise and cover the broken remains of walls, and bury all deep in soil, safe yet secret.

The very site and existence of such buildings pass from human knowledge. The plow does not go very deep, and harvests ripen over the site. Accident at last takes pick and shovel deeper than the plow, and there comes to light a fragment of wall, a stretch of an old tessellated pavement, and there, when careful search is made, is some fine old Roman villa whose sides and upper parts are gone, but whose floors and foundations have been preserved by the labors of generation after generation of earthworms.

SOME HARMFUL COUSINS OF OUR LOWLY FRIEND

But the earthworm is not the sole representative of its great class. There are worms in the sea, worms in still waters, worms on the shore, worms with almost unbelievable life-histories which live as parasites on animals and human beings. There are worms which, called flukes, arise from eggs in water, creep as larvæ into snails, and pass from these to vegetation eaten by sheep, in which the larvæ complete their course.

These creatures sometimes become a plague among sheep and periodically cause enormous losses among our flocks. Other forms infest minnows, frogs and birds. They are not harmful to adult birds, in whose crops they are killed, but if they are transferred unhurt by the old birds to baby birds, they develop in the nestlings and kill them.

The tiny worms which develop under the skin of human beings in hot countries; worms which penetrate human muscles and cause the disease known as trichinosis; the extraordinary U-shaped worms, formidable with bristles; all the leeches which suck human and animal blood—these are members of the great group to which the earthworm belongs, and may be studied in textbooks by all who desire fuller knowledge of the subject.

The earthworm is perhaps the least picturesque of them all, yet it is our only friend among them. We can all watch these for ourselves, for they thrive well in a pail of good garden soil. They can be observed at night by the aid of a shaded light, where we may see them collecting little stones, feathers and leaves with which to bar the entrance to their burrows. Not all the things they collect are taken below and devoured. They line their shafts with leaves, they make barriers to their front doors. Behind the barrier they lie with the head near the entrance, a habit which so often makes them prey to thrushes and robins.

THE WORK OF THE MASTER GARDENER OF THE EARTH

This fatal position which they assume in the burrow is supposed to arise from a desire to be near the open air, perhaps to snuggle up to the warmth which in such a position exceeds that of the damp earth below. When we see dozens of birds foraging on the lawn, tearing up earthworm after earthworm, we wonder how the stock of earthworms can be maintained, but it is constant. The numbers born equal the numbers eaten.

The heavy soil overlying the clay which is the foundation of the lawn is gradually worked over and over, the drainage is improved, sour soil sweetens, the advance of moss is checked, the rich green grass grows stronger, and we have turf soft, thick and velvety—a joy to tread, a delight to rest on.

It is the earthworm, our master gardener, who does the work. Out of sight and out of mind, he makes soil fruitful, fine and rich for the whole of our habitable earth.

THE END OF THE BOOK OF ANIMAL LIFE.

A MODERN ORCHESTRA IN POSITION TO PLAY

If you should go to a symphony concert to-day you would see an orchestra that looks very much like the one in this picture. It is the New York Symphony Orchestra, one of the oldest organizations of its kind in the United States. Standing on the platform in the foreground is its conductor, Walter Damrosch. In the modern symphony orchestras, which play in many of our large cities, we can usually find nearly one hundred performers on all kinds of instruments—more than twice as many as there used to be in the orchestras of the days of Haydn and Mozart. The picture shows how the players are arranged. In front are the violins: the first violins on the left, and the second violins on the right. Behind them are the larger members of the violin family, the violas and cellos. Largest of them all, the double-basses in the very back, are so big that the men who play them have to stand up. In the midst of the orchestra are the wood-wind instruments and French horns. To their right are the trumpets, trombones and tuba, while behind them are the drums and cymbals.

Photo, courtesy of the New York Symphony Orchestra.

Courtesy of the Æolian Company, Paul W. Furstenberg, artist.

Wotan's farewell to Brunnhilde in Wagner's opera The Valkyrie.

THE DEVELOPMENT OF MUSIC

III. ROMANTIC COMPOSERS AND THE MUSIC OF TO-DAY

CONTINUED FROM 7076

SOME of the great composers of the past we call "classic" composers, others we call "romantic" composers. What is the difference between the two? Surely romantic composers wrote something more than just music of romance. As a matter of fact, what we mean by a romantic composer is one who puts into music his ideas and feelings, and is more interested in making his compositions beautiful and inspiring than he is in making them well-balanced in form. This does not mean that romantic music is always more beautiful than classic music. But we can be carried away in our feelings more easily by romantic music, for it appeals more strongly to our senses.

One way in which romantic music delights our ears is in changing keys. The keys in music are like the stories in a house: each key is a different level. If a piece starts in the key of C, it is like being on the ground floor. When it changes to C sharp, you are on the landing halfway up the front stairs. When it changes to D, you are on the second floor. Classic composers always changed keys very carefully, and only because they wanted to move to a different level. But the romantic composers moved suddenly from one key to another to make pleasant surprises—the kind of surprises you have in an interesting old house in which you are always going up or down a few steps from one room into another. Modern composers thrill us by whisking us from one key to another as if we were being suddenly dropped or raised in a fast elevator.

Though Beethoven, Schubert and Mendelssohn put romantic feeling into their music, it was still mostly classic. Not until Schumann appeared do we find a composer who was romantic through and through. Robert Schumann was a man full of enthusiasms, yet often whimsical and dreamy. His music is much like him. Many of his pieces are as alive with vigor and spirit as a young horse; others show a gay humor; still others are fanciful and dreamy. Schumann liked to have his music tell stories or describe things. He gave his compositions names such as "Carnival," "Butterflies," and "Scenes from Childhood."

At first Schumann did not want to study hard at music. He thought a composer could write just as well without doing any hard work. Later he

found this was not true, and he made up for what he had missed. But he never learned thoroughly how to write for the different instruments in the orchestra, and so his orchestral pieces often sound muddy.

Besides being a composer, Schumann was a music-critic. He wrote about other composers and their music, and started a musical magazine. By doing this he helped people to learn to appreciate romantic music. He also helped young composers to success, and praised, among others, Chopin, Brahms and Wagner, who later became very famous. Among Schumann's works are four symphonies, a beautiful piano concerto, and many piano pieces and songs.

In opera romantic music began a little earlier, for at about the time of Beethoven a composer named Weber was writing romantic German operas. The stories of Weber's operas were old legends. The music was based on folk songs. This was a great change from the artificial operas that had been given before, and Weber's operas became very popular. His most famous one is the fairy story Oberon.

How Chopin Made Piano Music Sound Different

Another composer who lived about the time of Schumann was Frédéric Chopin, born in Poland but really a Frenchman. His music is romantic, but without the vigor of Schumann's. Most of it is delicate, dreamy and very beautiful. The most interesting thing about Chopin's music is that it is almost all written for the piano. He composed no symphonies. But he was so successful in those piano pieces that he has won a place among the greatest musicians. In writing for the piano Chopin invented a new style that made chords sound richer without becoming blurred and muddy. This style spaced the lower notes of a chord wide apart and the upper notes close together, instead of having them evenly spaced. If you notice a person playing a piece by Chopin you will see his left hand moving about in great skips, while his right hand runs over many notes near to each other. Ever since his day composers have followed more or less Chopin's style of writing for the piano.

With Chopin all music was like beautiful poetry, and he felt that it was to be played with great expression. His pieces were mostly simple and short. He was fond of dance rhythms and wrote not only waltzes, but polonaises and mazurkas, which were national dances of his native Poland.

Bright, Tuneful Operas by Italian Composers

In Italy opera was the popular form of music. Gaily-colored costumes and exciting action on the stage pleased the Italian people better than drab concert halls. Their operas were full of bright, cheerful tunes. One of the most famous of Italian composers was Verdi. His many operas are full of melodies. It is said that when he was a boy he loved to hear the hand-organs play. And to-day when we listen to the Italian hurdy-gurdy-man playing, it is very often the music of Verdi that we hear. In Verdi's opera Il Trovatore is the famous Anvil Chorus, in which the clanging sound of anvils beats time to the music.

While Schumann was composing in Germany a French musician called Berlioz was writing compositions which many people at the time thought strange, though they sound perfectly natural to our ears. He wrote for the instruments of the orchestra in new and interesting ways which attracted much attention. Among his best-known works is his Fantastic Symphony. This piece is different from the symphonies that had been written before, for it tells a whole story. The symphony pictures the life of an artist. In it the music represents a ballroom scene, a conversation in the fields between a shepherd and a shepherdess, a crashing thunderstorm, and many other things. This kind of musical story-telling we call *programme music*. Berlioz was not the first composer to write in the programme style, but he was the first to write in the elaborate story-telling way which many modern composers now use.

The Stirring and Difficult Piano Music of Liszt

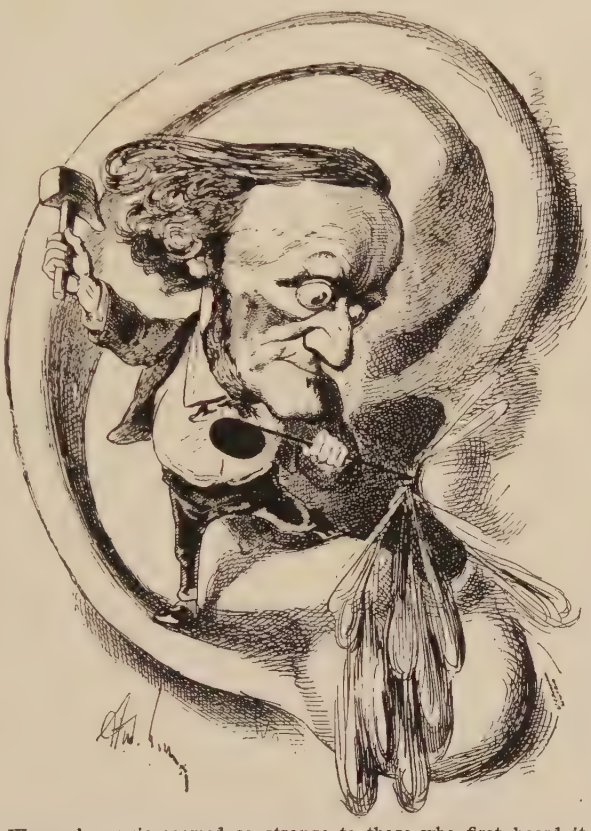
One of the most popular musicians of the nineteenth century was Franz Liszt. He was a noted composer, but was even more famous as a pianist. When he was a boy he heard Paganini, a very remarkable violinist, play. Liszt was dazzled by the marvelous feats of the great violin-player, and resolved to be as great a performer on the piano as Paganini was on the violin. His ambition was realized. In later years Liszt traveled all over Europe, amazing his audiences by his

skill. Besides composing, Liszt arranged for the piano many works of other great musicians—songs, operas, organ fugues and orchestral pieces. These are called *transcriptions*, and are very famous. He also combined many of the folk songs of Hungary, the land of his birth, into pieces called Hungarian Rhapsodies.

While Chopin's style of piano music was delicate and dreamy, Liszt's was just the opposite—brilliant and showy. His pieces are full of sweeps, runs and crashing chords. Often they sound as if a whole orchestra were playing. Though some of the time Liszt's works are noisy and cheap, at other times they are very noble and stirring.

Of all the romantic composers, the one who deserves most of all to be called romantic was Richard Wagner—Liszt's son-in-law—who wrote emotional, dramatic music and many German operas with fascinating stories. Until the time of Wagner, operas had depended mostly on tuneful music and famous singers for their success. The stories were forgotten while the operatic stars displayed their highly trained voices. But Wagner did not at all approve of that kind of opera. In fact, his operas are so different from the older operatic works that they are sometimes called by a different name—*music dramas*.

Wagner wrote not only the music of his operas, but the words, too. Their stories he took from medieval tales or old German legends, and these were in many places exciting and dramatic. Wagner then composed the music to fit the action. So well did he do it that even when his music is played without scenery, singing or acting, we can imagine the stories that go with it. In one scene in The Valkyrie a magic ring of fire appears. The music Wagner wrote for this scene makes us imagine at once tiny flames darting here and there. Because he wanted to create such effects Wagner made the orchestra much more important than the singers. He also helped to describe his stories in music by using *leading motives*. Different persons in the operas are described by different "motives," or bits of music. Whenever we hear a motive played by the orchestra we are reminded of the person whom it describes.



Wagner's music seemed so strange to those who first heard it that he was sharply criticized and ridiculed. In this caricature he is shown murderously attacking the human ear with a note.

Many persons at first made fun of Wagner's music because it was new and strange and they could not understand it. But now people recognize its emotional richness and beauty. And since Wagner became famous many composers have followed his ideas in writing operas.

BRAHMS ADDS NEW RICHNESS AND BEAUTY TO CLASSIC MUSIC

In the midst of the musical successes of Liszt and Wagner there quietly emerged the figure of another composer, whose music is of a totally different nature—not so strangely new or dramatic, but nobler and more majestic. This man was Johannes Brahms. Instead of fol-

lowing other musicians of his time and writing in a purely romantic manner or composing programme music, Brahms turned back to the classic style of Haydn, Mozart and Beethoven. But he did not imitate these composers: he used classic forms, and to them added a richness and beauty they had never had before. His was a happy combination of classic and romantic music.

Too often we hear people say Brahms is too intellectual, too academic—that his music is dry and hard to understand. No wonder many of us are frightened away from Brahms before we have had a chance to find out what he is like. True, when we hear the masterpieces of Brahms we have to keep awake and use our minds to enjoy them fully. And much of his music seems very dull until we get to know it better. But many of his shorter pieces, such as his waltzes and Hungarian dances, are delightfully gay, and charm us instantly. All of Brahms's music grows more lovely each time we hear it.

Brahms cared nothing for popular praise. He wrote, not to please the public fancy, but to create beautiful and perfect music. When Cambridge University offered him the great honor of a degree, and suggested that he compose something for the occasion, Brahms replied that if any of his old works seemed good enough to them he would be glad to accept the honor, but he was really too busy to write anything new. So high were his ideals that he destroyed all the music he wrote which seemed to him not good enough.

Brahms wrote symphonies, concertos, chamber music for small combinations of instruments, piano pieces, songs—almost everything except operas. And in all these forms his compositions are never commonplace, but tower before us like rugged and nobly beautiful mountains. Many people say that there are three great B's in music—Bach, Beethoven and Brahms.

A composer whose music was more emotional and less studied than Brahms's was the Russian Tschaikowsky. With Tschaikowsky music was an eloquent language. His compositions are often mournful and gloomy, like many other Russian pieces, and his melodies are so appealing as to stir our feelings. In one of his symphonies, called the Pathetic Symphony, he seems to be crying out in distress against Fate itself. Tschaikowsky was an expert in writing for the orchestra. He combined instruments to produce rich effects, and wrote gloomy passages for the bass instruments.

Meanwhile Franck was writing music in France of quite a different sort. He divided his time between playing the organ, teaching and composing. His music was dignified and lofty, and often marked by religious feeling. Franck was inspired by the old church music of the time of Bach. He himself wrote often in the counterpoint style made famous by Bach and Palestrina.

THE WONDERFUL AND ENDLESS BYPATHS OF MODERN MUSIC

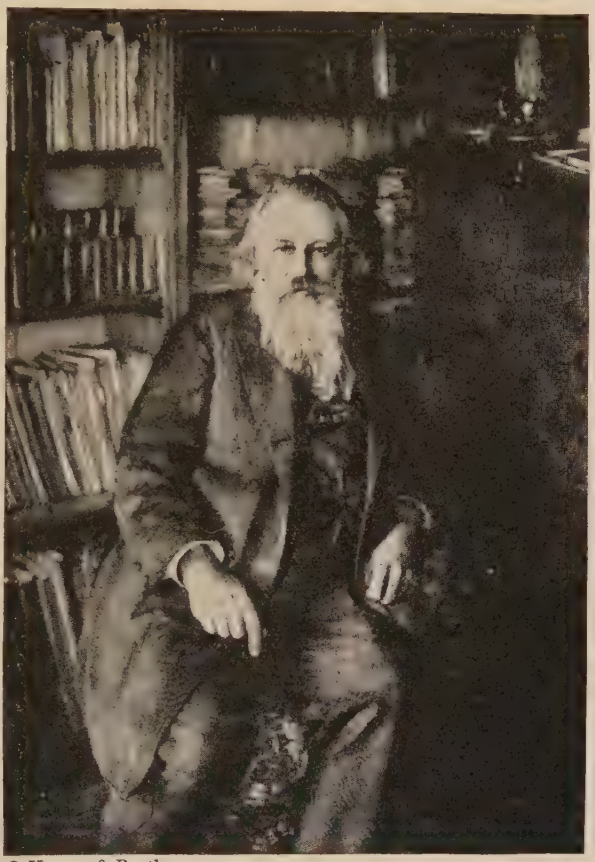
Music of to-day has branched out in so many directions that it is impossible to follow all the bypaths by which it is leading us continually into unknown and marvelous lands. To describe a very few paths and a few composers who are walking them will have to be enough.

When we hear a huge symphony orchestra, with its many rows of instruments, play a work by Richard Strauss, we are thrilled by the tremendous volume of sound and the dramatic and exciting passages. That is one thing Strauss did. He started where Wagner had left off in making the orchestra more powerful. He wrote in Wagner's thrilling style. Then, too, Strauss wrote his works as programme music, making them tell stories. In Don Quixote the orchestra even imitates the bleating of a flock of sheep, and, by a special machine which imitates the whistling of wind, suggests a ride through the air.

Another new style of music came into being shortly before the beginning of the twentieth century—*impressionism*. Its inventor was the French composer Debussy. Among Debussy's friends were a number of artists who were interested in impressionistic painting. This type of painting *suggests* objects by spots of color instead of outlining objects clearly. Debussy decided that music as well as painting could be impressionistic, and tested out his ideas by writing some. His compositions, because of their unusual harmonies, sound queer to us beside the music of the past century. All sorts of rich and strange chords are used, even to the "whole-tone" scale, and the effect is that of soaring among the clouds. An-

other French composer often classed with Debussy is Ravel. Both of them are noted for soft, delicate effects, and have used the queer, dissonant chords we call "modern harmonies."

A number of other composers of today take delight in harsh, dissonant harmonies that would have driven Mozart distracted. Two Russians, Scriabine and Stravinsky, have written weird pieces which at times sound like nothing but noise, but at other times have a strange, haunting beauty. Schönberg, in Germany, has attracted attention for queer, jumbled music. One of his pieces is a string quartet which runs for forty-five minutes without having a single group of notes that sounds like harmony.



© Harper & Brothers.

Following the noble classic forms without being enslaved by them, Brahms gave them a new touch of romantic beauty and richness. Here you see the composer in his study.

In America there have been very few men who have even given promise of living for all time as great composers. The best-known American musician is MacDowell, whose short pieces describe country scenes, the ocean, and music of the American Indians. But the world is still waiting for a composer who will take the spirit of America and translate it into sublime music. Great composers of the past have been inspired by the folk songs of their native lands, and have written music which we call "national" music. Old German songs, Viennese waltzes, polonaises from Poland, Hungarian dances with their dashing rhythms—all have been used in symphonies or other orchestral works.

But what is the folk music of America? Perhaps the Indian melodies, or the negro "spirituals," or jazz, which is called "the music of Broadway." At any rate, we can look to the future to see whether from this varied "folk" material some composer will create great and beautiful music. Many people believe that such a composer has already come; for one musician, Gershwin, has written serious music clearly based on the jazz to which modern folk dance. Among his compositions are a jazz Concerto in F and a piece called Rhapsody in Blue.

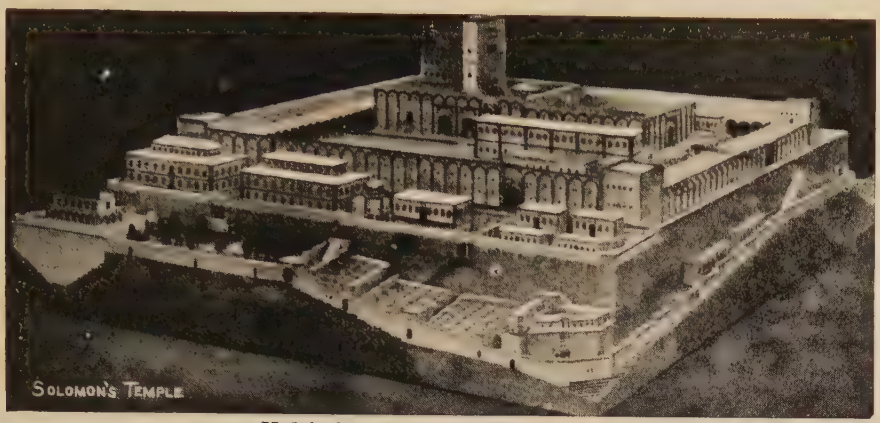
There is so much music in the world that we are sure to hear not only good music, but quantities of indifferent music, and much that is really bad. The *kind* of music is no guide to the worth. There is good band music and bad band music, good and bad opera, good and bad jazz, good and bad music for symphony orchestras. If we listen to enough of it we can learn to tell what is poor from what is fine. And when we do that, we can better appreciate the fine. The way to enjoy music most is not to sit back and dream while it is being played, but to try to remember the tunes and to notice how composers change their tunes and develop them. Music will give us the greatest pleasure if we listen to it not only with open ears, but with open minds and open hearts.

THE END OF THE STORY OF THE FINE ARTS.

HANNAH DELIVERS SAMUEL TO ELI

Hannah had vowed if God would give her a son she would give him to His service. Her prayer was answered. The good woman remembered her vow, and as soon as she was able she brought the infant, whom she had named Samuel, to the old priest, Eli, and gave him up to the service of the Tabernacle.

This beautiful picture is from the painting by Mr. F. W. W. Topham.



Model of the Temple built by Solomon.

THE SCATTERED NATION

CONTINUED FROM 7142

THE Book of All Countries has now described the principal countries of the world and the people who live in them. We have read of England and the English, France and the French, of Russia and the Russians—to name only a few—and we have given space to some small countries with few inhabitants. Yet we have omitted one of the most important and influential peoples of the world.

We cannot find their state on the map, for they have no separate country of their own, but are scattered over every continent. In America they are Americans; in England they are English; in the German State they are Germans; and yet they have not been swallowed up in these great nations.

Usually when people come to live in a country their children intermarry with the natives or with other immigrants, and in a few generations the original blood can hardly be traced. Many on this continent can find among their ancestors Englishmen, Frenchmen, Germans, Irishmen or Scotsmen who came here years ago. The people of whom we speak have not been lost in this way, but are yet distinct.

Who are these people and where do they come from? They are the Hebrews, commonly called the Jews, and their story is perhaps the most wonderful in all history. There is no other tale quite like theirs. If you will turn to the map on page 908 and will get your Bible, we shall soon find out some things about them. Here is the beginning of the story as told in the Bible.

Long, long ago, around a city called Ur of the Chaldees, some of the descendants of Noah lived. Among them were Terah and his sons. One of the sons was Abram, who had married Sarai. Though they had great flocks and herds they were sad, for they had no child. Terah, his son Abram and his grandson Lot left Ur and dwelt in Haran. There the Lord appeared to Abram and told him to go away from his country into the land of Canaan, and promised that he would make of his descendants a great nation.

Abram obeyed and removed to the country now called Palestine. You can find the whole story in the Old Testament. Abram was promised a son and told to call himself Abraham and his wife Sarah. The son was born and was named Isaac. He married his cousin Rebecca and they had two

sons, Esau and Jacob, later called Israel. The latter secured the greater part of his father's property by a trick, and married his two cousins Leah and Rachel. He had twelve sons. One of these, Joseph, his father's favorite, was sold into Egypt as a slave by his jealous brothers, who did not like the way their father favored him; and there, because of his wisdom, he finally became First Minister and the real ruler of Egypt. After a time, because of famine, Jacob and all his sons and their families were moved to Egypt, where land was given them, and where they increased greatly in numbers.

How the children of Israel came to the promised land

Years afterward the Egyptians became jealous of their prosperity. The rulers inflicted many hardships upon them, though they would not let them go out of the land. At last a great leader called Moses arose, and the children of Israel determined to leave Egypt and seek the land promised to Abraham. Finally they were allowed to go, and left Egypt, but for forty years remained in the Wilderness between Egypt and Palestine, where the Lord appeared several times to Moses and gave him laws for the people. The Bible says that the Ten Commandments were given to Moses in this way.

After the death of Moses a brave and skillful general named Joshua led them into the "Promised Land," where they contended for possession with the heathen tribes, sometimes conquering, sometimes losing, but always increasing in numbers. A tabernacle for worship was set up, and priests were chosen to offer the sacrifices. To this period belonged Gideon, Samson and the prophet Samuel. After a time they decided that they must have a king, and Saul was chosen. One of Saul's lieutenants was a young man, David, who had become prominent because, while a young shepherd boy, he had succeeded in killing with a sling and a stone the great champion of the Philistines called Goliath.

Saul became jealous of David and several times sought his life. Finally David and some companions rose in rebellion against Saul and were able to conquer part of his territories. Saul and his sons were slain in a great battle with the Philistines, and soon after David became king of Israel. There was much fierce fighting for a time, but at length the heathen tribes were forced to obey, and the kingdom grew more powerful.

Solomon, the wise king who built the temple

Many interesting events occurred during David's reign, but we cannot stop to tell them now—not even the sad story of Absalom, his favorite son, who rebelled. At the death of David another son, Solomon, became king, and under him the kingdom reached its greatest wealth and power. He built at Jerusalem a magnificent temple for the worship of the Lord; he sent ships to every port of the known world, and built great public works. The fame of his wisdom reached the ears of far-away rulers, who came to consult with him.

Solomon's great works cost much money, however, and at his death the people hoped that their taxes might be lightened. Solomon's son, Rehoboam, who succeeded him, was a proud and arrogant young man with high ideas of the power of a king, and threatened to make their lot harder. Under Jeroboam the northern part of the kingdom revolted and became the independent kingdom of Israel, leaving only the southern part, including Jerusalem, called the kingdom of Judah, faithful to Rehoboam. This division took place, as we count time, somewhere between 975 B.C. and 930 B.C., that is, around twenty-nine hundred years ago.

The fall of the northern kingdom of Israel

For more than two hundred years the story of the two kingdoms is not a happy one. Many of the rulers were bad, some were idolaters, and there was much fighting. Sometimes the two little kingdoms were at war with each other and sometimes with the stronger nations about them. Egypt and Assyria at times demanded tribute, and finally, about 721 B.C., Sargon, who had been a general of Shalmaneser, ruler of Assyria, and who succeeded him, captured Samaria, the capital of the northern kingdom and carried away some of the inhabitants to his own country, though many were allowed to remain.

What became of those who were carried away no one can say, though some men have tried to prove many curious things. Some have said that these "Ten Lost Tribes of Israel" somehow came to America and became the ancestors of

our Indians; some have thought that perhaps the Japanese are their descendants; some have suggested that the Irish come from them; and many other theories just as absurd have been advanced. It is probable that in their scattered state they mingled with the people with whom they lived, and finally lost their religion and forgot their ancestors. Their lands were taken by colonists sent out from Assyria.

THE SOUTHERN KINGDOM IS FINALLY DESTROYED

The kingdom of Judah endured for more than a hundred years longer, though for a time it was dependent upon Assyria and then upon Egypt. Some of the rulers were bad men, and the people often fell into the worship of the heathen idols, such as Baal and Ashtoreth. One great king, Josiah, restored the temple, and for a time things were more hopeful. The prophet Jeremiah, however, said that trouble was coming and warned the people to repent thoroughly of all their sins. Finally, about 606 B.C., Nebuchadnezzar, king of Babylon, which was now the great power in the East, conquered the country, though he allowed the king to remain as his vassal. Many of the wiser Jews, among them the great Daniel, were sent to Babylon to serve the king. Soon the people revolted, and in 586 B.C. Jerusalem was captured and largely destroyed, and some of the inhabitants were taken to Babylon. The governor whom Nebuchadnezzar had left in charge was killed by a member of the old royal family, and many of the remaining Jews fled to Egypt.

EZRA AND NEHEMIAH TRY TO BUILD UP THE KINGDOM AGAIN

In Babylon many of the Jews became important people, and after Cyrus, king of Persia, had conquered the city, he was persuaded to send to Jerusalem those Jews who wished to return. This was 536 B.C., fifty years after the city had been taken. Later another company under Ezra returned to their old home, and soon Nehemiah, a pious Jew, but a favorite of the Persian king, was made governor. Esther, a young Jewess, even became the wife of a later Persian king.

Then for a long period the little province was tossed back and forth among the kings who rose to power. It was taken by Alexander the Great, who granted the inhabitants many privileges. After his death, when his great empire had fallen apart, hapless Judæa was a cause of quarrel between Egypt and Syria for more than a hundred years. Many Jews went to Egypt to live, and some rose to high position. So many came to know only Greek that the Scriptures were translated for them. From the time that Joseph went down into Egypt there had been much intercourse with the Egyptians, and many traders passed back and forth.

Finally Judæa fell into the hands of Antiochus of Syria, who massacred many of the inhabitants and sold others as slaves, and defiled the temple. Their persecution became more than they could bear, and under Judas Maccabæus, a wonderful general, they almost freed their country from foreign tyrants. Unfortunately he was killed in battle, and the work was completed by Simon, his brother, and in 141 B.C. Judæa again became independent. For a time there was peace and prosperity, but divisions arose, and the great Pompey, of whom you may read on page 1366, captured Jerusalem, putting thousands to death, and carried many Jews to Rome. When Pompey fell before the power of Julius Cæsar the latter made Antipater, the Idumæan—a foreigner—ruler. Then his son Herod became "King of the Jews" by the vote of the Roman Senate.

HEROD, THE GREAT KING OF THE JEWS

His rule was hateful to the Jews, even though he married a princess of the old Maccabæan line, but his strong arm and great ability enabled him to maintain his power in spite of all his enemies who carried many complaints about him to Rome. When his troubled, stormy life was over, by his will he divided his kingdom among three of his sons. The one to whom Judæa was given was hateful to the people and the Romans took control, though Herod's descendants had a shadowy rule over some of the provinces for a hundred years longer.

During Herod's reign Jesus was born in Bethlehem, and under the Roman governor, Pontius Pilate, was put to death, but his disciples preached his doctrines and slowly his followers grew in number. At first they came only from the Jews, but after Paul became so prominent among them they admitted outsiders (Gentiles, they called them). Fierce disputes between the Jews and the new sect arose, some of the Roman rulers were

tyrants, and in the year 66 A.D. the Jewish war broke out.

JERUSALEM IS DESTROYED BY THE ROMAN POWER AFTER A FIGHT

The Roman emperor Nero sent his best general, Vespasian, to put down the rebellion. Terrible fighting followed, but before Jerusalem had fallen Vespasian became emperor, and left his son Titus to complete the work. Titus closed around the doomed city, but its defenders fought desperately. There was no food, the soldiers on the wall were so weak from hunger that they could hardly stand. All, men, women and children, struggled to keep out the invaders, but finally the walls were broken down, the Roman soldiers entered, the temple was destroyed, and most of the captives who were left alive were sold as slaves. This was in the year 70 A.D.

Thus perished Judæa. Later the Jews left in the country again rebelled against Roman authority, but were put down by Hadrian. Jerusalem was rebuilt, but no Jew was allowed to enter. Since that time Palestine has not been under Jewish control. The Roman Empire was divided, and became weak, and the land has since been held first by the Persians, and then by Arabs and Turks. During the Crusades it was for a little while ruled by Christian princes, but the Turks soon regained control again. In 1917, during the World War, Jerusalem was captured by the British, and many Jews hope that a Jewish state will again be set up after the centuries that have passed since it was destroyed.

Other countries have gone in much the same way. Assyria, Chaldea, Babylon are now but names. All that is left of them is contained in a few records which the wise men try to read. Their people were swallowed up and soon forgot the glories of the past.

WHY HAVE NOT THE JEWS DISAPPEARED AS A PEOPLE?

Here is the strange, the wonderful difference between Judæa and all the rest. The kingdom of Judæa was destroyed, but the Jews are a vital force to this day. Never in history have there been so many of them, never have they been so influential and so powerful as to-day. What is the reason for this marvelous difference?

Some wise Jews say that the long captivity in Babylon is partly responsible. Before this time they had often forgotten the Lord and turned aside after strange gods; they forgot the Law of Moses and neglected their religious duties. In Babylon they were in a strange land. Though many succeeded in business and others held high places in the state, they felt that they were strangers. Their religion, the fact that they were Jews, the "chosen people," became more and more important. They thought about it, talked about it, and the feeling grew stronger. The rules of conduct grew stricter, and they took a pride in obeying them. Learned men discussed the Law and the Torah, and interest in all the sayings of the great teachers became intense.

Not all the Jews in Babylon returned to Jerusalem: many remained there, and as business called them, traveled to different cities and settled there. What is known as the "Dispersion," that is, the scattering, began, and has never ceased to this day.

HOW THE JEWS WERE SCATTERED OVER THE WORLD

After Jerusalem was destroyed by Titus most of the inhabitants were taken to Italy or to the Roman colonies in France and Spain. Permission was given, however, to a famous rabbi, or teacher, Johanan ben Zakkai, to open a school at Jabné, or Jamnia. From this school went out many teachers, all of whom worked to make all Jews feel that nation and religion were one, that all were brothers no matter how widely scattered. There were other schools at Babylon and Alexandria, for example, and all did their work well.

They did not give up their hope of again gaining Jerusalem, and several times strove fiercely in arms against the Roman power, which did not at first treat them so harshly as might have been expected. When Christianity became the state religion of the Roman Empire under Constantine, as you may read on page 1866, their lot became harder, except as their wealth protected them. The Mohammedan power was generally friendly, and in Spain they became very important. Jewish physicians were believed to be the most skillful, Jewish traders and bankers were the favorites at many courts, and Jewish scholars and teachers were the companions of the wisest.

THE SAD STORY OF THE JEWS IN SPAIN

When the Moorish power in Spain weakened, the Christian rulers at first

NEW LIFE IN AN ANCIENT LAND

Gray-Hill House, the main building of the new Hebrew University on Mount Scopus, near Jerusalem, which was dedicated with impressive ceremonies in 1926. Teaching is conducted in the Hebrew language.

This little village between Nazareth and Jerusalem shows the nature of the country. You can see the fruit trees in bloom and the terraces on the hillsides. Photo, courtesy Canadian Pacific Railway

A street in Tel-Aviv, a Jewish garden-city not far from Jaffa.

Electricity comes from the Jordan to this power station at Haifa.

Except as otherwise noted, photos by courtesy of United Palestine Appeal.

protected the Jews, but later began to persecute them. Thousands were forced by torture to call themselves Christians, but many of these "Maranos," as they were called, secretly observed Judaism. They were spied upon, and many were put to death. Finally, in 1492, Ferdinand and Isabella ordered all Jews to leave Spain, taking none of their possessions with them. They went to Italy, Turkey, Morocco and Holland.

During the Middle Ages the lot of the Jews in Europe was very hard. When they were allowed to live in a town at all they were generally confined to a particular quarter of the city and often were compelled to wear a special dress. Rulers forced them to pay large sums of money for the privilege of living in a country, and sometimes tortured them if they attempted to escape the demands.

THE JEWS IN GERMANY AND THEN IN POLAND

For a time the princes of Germany protected them, but as persecution grew harder, many went to Poland, which was most liberal in its treatment of them, though even there they suffered much. Their sufferings, however, only made them cling more closely to the Law and the explanations of it comprised in their sacred book called the "Talmud." Many studied nothing else, just as some Christians have said that it is useless to have any knowledge not contained in the Bible, and strict Mohammedans refuse to study any other book than the Koran.

As men grew wiser they began to recognize the fact that it is foolish and wrong to persecute a man for his religious beliefs. So one by one the countries of Europe began to repeal some of their harsh laws. In the most enlightened countries such laws have all been repealed. In all English-speaking countries Jews have equal rights with all other citizens.

HOW SOME COUNTRIES HAVE PERSECUTED THE JEWS

In Russia, however, which until lately included much of the old kingdom of Poland, where there are more Jews than anywhere else, conditions have been very little better than they were in all Europe five hundred years ago. They have not been secure in the possession of their property; right of travel and settlement except in certain localities has been denied them; and only small numbers have been allowed to attend the schools. We are watching with interest to see how the new governments of Russia and Poland will deal with the Jews.

It is a general rule that the more backward a country is in civilization, the more harshly it treats the Jews, or, for that matter, the stranger within its territories. Those countries which are free themselves are willing for others to be free. So it is the states of Eastern Europe, which have had tyrannical governments, that show the most harshness.

This harshness endured by the Jews for hundreds of years had its effect upon them. We cannot wonder that their eyes were always turned backward to the days of their former glory, and that they lived in the past. One great man, Moses Mendelssohn, is given the chief credit of waking his fellows from their slumber. By his writings, his addresses and his personal influence he started a movement which has made the Jew a citizen of the world.

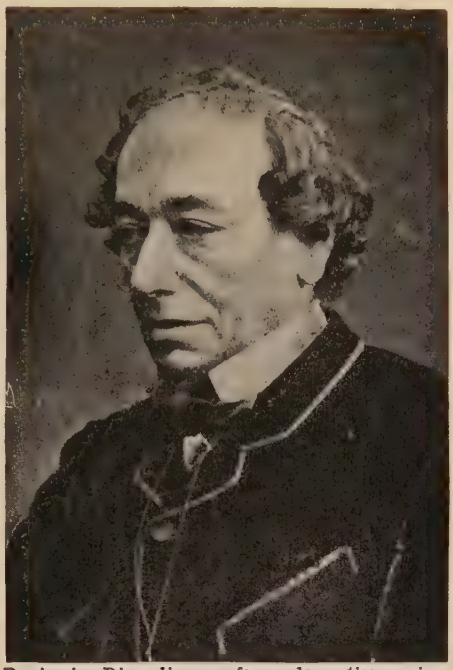
For a long time all the Jews observed the Law very strictly, though there were some differences among the different sects. After Moses Mendelssohn, however, a party known as the "Reformed" Jews arose. These say that all the different points in the Law do not fit modern life, and so they have omitted many of the ceremonies which the "Orthodox" Jews observe. They cling, however, to the principal things, and have many synagogues in the principal cities of Europe and America. There are also "Conservative" Jews who take a middle course.

WILL THE JEWS RE-ESTABLISH A NATIONAL HOME IN PALESTINE?

Recently you have heard much of Zionism and have understood that it meant re-establishing a Jewish National Home in Palestine. Perhaps, however, you have been puzzled because the word does not seem to mean the same thing to everyone. The establishment of a Jewish homeland in Palestine has been advocated for different reasons. It has been advocated by Jews who were disturbed because the new freedom seemed to be weakening Jewish ties. They have feared lest the Jews be absorbed into the general population and that Judaism would disappear. They therefore have advocated the establishment of a Jewish commonwealth in Palestine where Jewish ideals would rule.

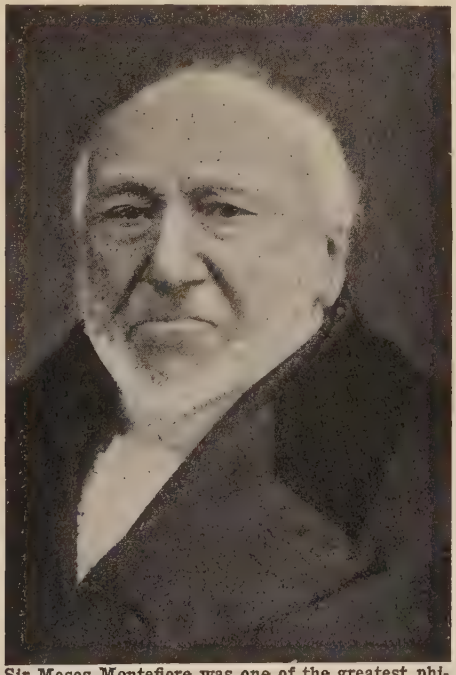
FOUR WORLD-FAMOUS JEWS

Felix Mendelssohn-Bartholdy was one of the most popular musicians of his time, and his compositions are still much admired. He was a grandson of Moses Mendelssohn, the great reformer.



Benjamin Disraeli was for a long time prime minister of Great Britain and was raised to the peerage as Lord Beaconsfield. He also wrote many novels and was a brilliant talker.

Judah P. Benjamin, of Louisiana, was a Senator of the United States, and then a member of the Confederate States Cabinet. After the Civil War he went to England and became one of the most successful lawyers in London.



Sir Moses Montefiore was one of the greatest philanthropists the world has ever known. He used his wealth for those less fortunate than himself, but always gave wisely. Evidences of his generous gifts are seen in every country.

On the other hand, there are those who urge the establishment of a strong Jewish commonwealth in Palestine as a place of refuge for Jews who suffer persecution in various lands. They feel that such a place of refuge would become a rallying-point and a spiritual centre for the Jews of the world. This would certainly have an effect in lessening persecution. At one time there were some Jews who believed that another land than Palestine might be suitable for the purpose. However, the sentimental reasons in favor of Palestine were so overwhelming that little attention was given to finding a place elsewhere.

In 1897 Theodore Herzl, a great Jewish leader, organized the World Zionist Organization, which promoted the colonization of Palestine, carried on diplomatic negotiations with governments, and sought to win the sympathy of the world for the idea of re-establishing a Jewish commonwealth in Palestine.

So you see the idea has been advocated for different reasons, while some Jews oppose it altogether. During the World War, even before the British overran Palestine, the Government announced that they favored "the establishment in Palestine of a National Home for the Jewish people," but that the rights of the non-Jews must be safeguarded. There are difficulties in carrying out the idea. At present Jews form perhaps one-fifth of the population, while over three-fifths are Mohammedan Arabs whose ancestors have lived in the country for hundreds of years, and about one-tenth are Christians. To place the government entirely in the hands of a small minority of the population would certainly cause trouble. Nor is it the policy of the British Government to do so.

Meanwhile, since the conclusion of the World War, Jews have been streaming into Palestine from Poland, Russia and other lands of Eastern Europe. Since the war the Jewish population of Palestine has nearly trebled. Strong efforts are being made to make them self-supporting by establishing irrigation works and various industries. Over a hundred Jewish agricultural settlements have already been built, besides several towns and suburbs; a Hebrew University has been established; and a National Committee represents the Jewish people in dealing with the British administration.

Palestine, however, is about the same size as Vermont, and the present population is more than twice as great. Like Vermont, much of the soil is not suitable for agriculture. Nevertheless, experts have estimated that, with agriculture and industry modernized and developed, Palestine could support from two to four million of additional population. Most Zionists would be satisfied if so many Jews could find a home in Palestine, where they could live in accordance with their own spirit and ideals. It is plain, however, that the land cannot hold all of the fifteen million Jews of the world, and it is not expected that all will go. In fact, in the near future it is probable that few will leave those countries where they are now prosperous and contented.

WHAT SOME OF THE EUROPEAN JEWS HAVE DONE

To name the great men and women of Jewish blood who have accomplished so much would take a long time and occupy many pages of our book. Therefore we can name only a few, not always the greatest, but some of the most interesting.

Music is an art in which those of Jewish blood have been prominent. Mendelssohn-Bartholdy who wrote the Wedding March so often played, was the grandson of the Moses Mendelssohn mentioned above. Rubinstein, the great pianist, Meyerbeer and Offenbach, the composers, and Joachim, the violinist, as well as hundreds of other composers, performers and singers, have shown the Jewish talent in this art. Two of the greatest actresses of Europe, Sarah Bernhardt and Rachel, were both born Jews, and many artists are of the same race.

In France and Italy Jews have been ministers of state, but one of the most interesting statesmen of all was Benjamin Disraeli, afterward Lord Beaconsfield, who rose to be prime minister of England. But though Disraeli was of the Jewish race, he did not follow the religion, but became a Christian.

Lionel Nathan Rothschild, a member of the great family of bankers which has been powerful in several European states for a hundred years, was the first Jew elected to the English Parliament. Though refused a seat at first, the city of London continued to elect him until the law was changed and he was admitted. His son, Nathan Meyer, was made a

BACK TO THE SOIL IN PALESTINE

Tobacco-growing has recently been introduced into Palestine by the Jewish colonies, and now employs several thousand workers of both sexes.

Agriculture is taught in the schools, and here we see the children applying under direction what they have been taught.

The climate of Palestine is not unlike that of some parts of southern California, and Palestine oranges are much liked. This picture, with the odd combination of camels and steel freight cars, shows fruit coming to the railway for shipment to Europe.

Photos, courtesy United Palestine Appeal.

member of the House of Lords in 1885, the first Jew to be created an English peer. Several others have been created since. Several Jews have been members of the British Cabinet, and in 1913 Sir Rufus Isaacs, now Earl of Reading, was made Lord Chief Justice of England, and in 1921 Viceroy of India.

While the Jews in Germany have not held so many important governmental positions, they have probably surpassed those of any other country in scholarship and in literature. Some of the greatest scientists, the most learned historians, and most noted scholars have been Jews.

Photo, courtesy Mr. Henry Joseph, Montreal.
Rebecca Gratz was born in Philadelphia in 1781 and lived until 1869. She is said to be the original of Rebecca in Ivanhoe.

Recent examples are the late Dr. Paul Ehrlich, the noted bacteriologist, and Professor Albert Einstein, the author of the theory of relativity. One of Germany's greatest poets, Heinrich Heine, was also born a Jew.

We must not forget Spinoza, the Jewish philosopher of Amsterdam; or Sir Moses Montefiore, who gave a great fortune to help his unfortunate fellows, or David Ricardo, whose book on political economy, which is the science of wealth, is studied in every university. The founder of modern socialism, Karl Marx, was also born of Jewish parents.

THE JEWS IN NORTH AND SOUTH AMERICA

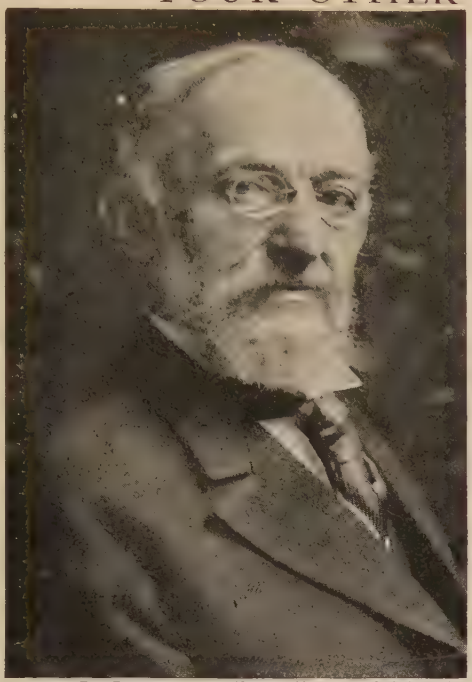
It is said that some of the members of Columbus' crew were of Jewish blood, and some of the earliest settlers of the Spanish and Portuguese colonies were Jews. They were particularly numerous in Brazil, where they became wealthy. From Brazil came a little colony to New York, or New Amsterdam, as it was then called. This city is now the greatest Jewish city in the world, as it is estimated that more than 1,500,000 Jews now live in or around New York, making about one-fourth of the population of the city. Before the Revolution there were a few Jews in nearly all the thirteen colonies.

During the Revolution many Jews served in the Continental Army, while others were useful in civil life. One of the most interesting is Haym Salomon, who gave both time and money to the cause of liberty. He was born in Poland about 1740, and in 1772 came to New York, where he soon made a fortune. He favored American independence and was imprisoned by the British authorities, but escaped and went to Philadelphia. Here he was useful in negotiating the loans from France and Spain, and furnished much money from his own purse when it was needed. He also advanced money to many Revolutionary officers, members of Congress and other officials who might have had to quit their posts but for his liberality. He died in 1785, before his accounts with Congress were settled, and it seems that the amount due his estate has never been repaid. The sum loaned has been estimated at more than $600,000.

Just as the Revolution was ending, a girl was born in Philadelphia whose name has come down to us as a symbol of unselfish devotion. Rebecca Gratz was a member of a wealthy family, and grew up a beautiful girl, as her portrait by Thomas Sully shows. Her thoughts, however, were always of others, and she was prominent in every charitable movement, not only for her own people, but for the city as a whole. Washington Irving was a frequent visitor in her home, and he afterward related that he had told her story to Sir Walter Scott, who drew the character of Rebecca in Ivanhoe from his description of the virtues of this "daughter of Israel."

During the first hundred years of American independence Germany was the chief source of Jewish immigration to the United States. Many of these were well educated and had some capital. They

FOUR OTHER FAMOUS JEWS



Oscar S. Straus was three times minister to Turkey, Secretary of Commerce and Labor, member of the Court of Arbitration at The Hague and of the Public Service Commission of New York.

The Earl of Reading, who was made Lord Chief Justice of England in 1913, became Viceroy of India in 1921. He has also been Solicitor-General and Attorney-General of England.

Louis D. Brandeis studied law at Harvard and practiced in Boston, gaining a wide reputation. He was appointed a justice of the Supreme Court by President Wilson.

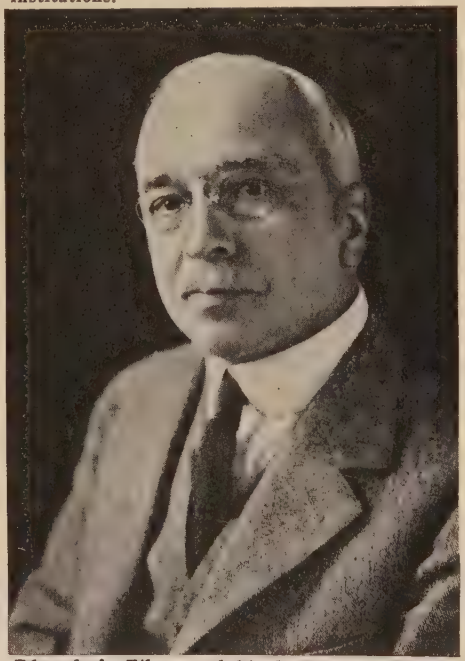
Adolph S. Ochs is the publisher of The New York Times and The Chattanooga Times. He has made possible the publication of an encyclopedia of American biography.

Photo of Ochs, Underwood & Underwood. Others, Brown Bros.; that of Straus copyrighted.

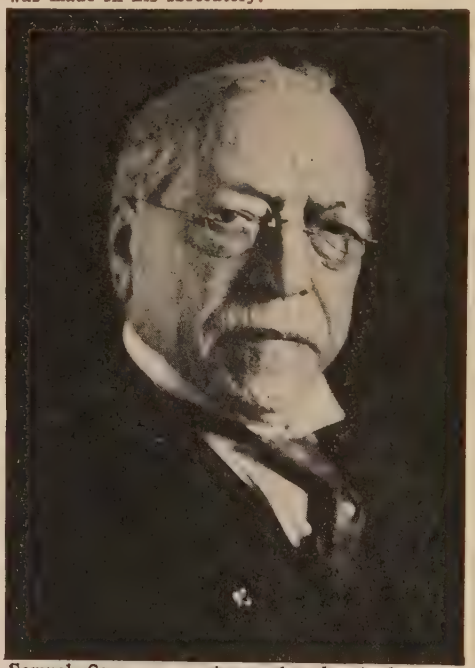
FOUR NOTABLE AMERICAN JEWS

Julius Rosenwald, a merchant of Chicago, is distinguished for his interest in education and public welfare. He has made many large gifts to various institutions.

Albert A. Michelson, professor of physics at the University of Chicago since 1892, was awarded the Nobel Prize for Physics in 1907. This picture was made in his laboratory.



Edward A. Filene and his brother, A. Lincoln Filene, merchants of Boston, have given much time and money to civic and welfare work of many different kinds.



Samuel Gompers, a cigar-maker by trade, was president of the American Federation of Labor for over forty years, and had world-wide influence. He died in 1924.

Photo of Mr. Rosenwald, courtesy The American Hebrew; others from Underwood & Underwood; those of Messrs. Michelson and Gompers copyrighted.

scattered to various sections of the country and soon became influential in the cities and states of their adoption. The names of over seven thousand who served in the Union or Confederate armies are known. It is said that six Cohen brothers enlisted from North Carolina and five Wenk brothers from New York.

An American Jew quite as interesting as Disraeli was Judah P. Benjamin, who was United States Senator from Louisiana from 1852 to 1861, and then Attorney-General, Secretary of War and Secretary of State in the Confederate Cabinet. After Appomattox he went to London, at the age of fifty-four, was called to the English bar and gained an enormous practice in his new home.

In later years the persecutions in Russia, together with the hope of bettering their condition, brought many thousand poor Jews to the United States. Here they settled chiefly in a few large cities, where they often worked hard for small wages and were too much crowded for health. Nevertheless, their condition has improved steadily, and many have become prosperous. In all there are over three million Jews in the United States.

The Jews in the United States have taken, and are taking, part in every form of activity. Among them are distinguished lawyers, physicians, scholars, scientists, inventors, teachers, authors, editors, musicians, actors, artists and sculptors. They are important in the production of plays, both on the speaking stage and in moving pictures. There are successful merchants, manufacturers, bankers and business men, as well as mechanics and workmen. There are some successful Jewish farmers.

Many Jews have held high positions in the service of the United States. Beginning with Judah P. Benjamin, several have been members of the United States Senate, and many have been members of the House. Oscar S. Straus, three times minister to Turkey, was a member of President Roosevelt's Cabinet. Henry Morgenthau has also been minister to Turkey. Joseph Kornfeld has been minister to Persia, and Lewis Einstein is at present minister to Czecho-Slovakia. Louis D. Brandeis is a justice of the United States Supreme Court. Though holding no public office, Samuel Gompers, president of the American Federation of Labor for forty years, wielded immense influence. During the World War the Jew did his share in the ranks and performed many acts of heroism.

In the state governments they have likewise been important. Several have been governors of states, and many have been judges, state officials, mayors of cities, besides holding many minor offices in the service of state or municipality.

Many of the most distinguished college and university professors are of Jewish blood. Professor Albert A. Michelson, of the University of Chicago, was awarded the Nobel Prize for Physics for 1907, and has been president of the American Association for the Advancement of Science. There are others hardly less distinguished.

In business they are no less successful. Some of the most important banking-houses in the great cities are controlled by Jews. The manufacture of clothing is almost entirely in their hands, and they are also largely engaged in other kinds of manufacturing. Some of the largest and finest department stores in the great cities are owned and managed by Jews.

They are liberal givers to charity and education. They maintain orphanages for homeless children, homes for the aged and afflicted, and some of the best-equipped hospitals in the country have been built by Jewish money. They have organized societies to take care of the ignorant immigrant and to help him when work fails or sickness comes. Some Jews observe the old rule of Moses which declares that a man must devote a tenth of his income to religious and charitable purposes. Nor is their benevolence confined to their own people.

Where there are so many liberal givers it seems unfair to select only a few, but perhaps Jacob H. Schiff, Joseph Pulitzer, Mr. and Mrs. Felix Warburg, Julius Rosenwald, Adolph S. Ochs, and Nathan Straus may be mentioned. Dozens might be named with equal justice.

There are not very many Jews in Canada. The census of 1921 showed 125,190, of whom over three-fourths were in Quebec and Ontario, and 16,593 in Manitoba. As elsewhere, they live chiefly in the larger cities. Some have attained distinction in the professions or success in business, but on the whole they are not such an important element in Canada as in the United States.

THE END OF THE BOOK OF ALL COUNTRIES.

THE TIGER-LILY

This Lily is very stately, and is a great ornament in any garden. It is easily cultivated, and needs a deep, sandy loam with an open but sheltered position. It was taken to England from China.

YELLOW LILY

All lilies are very stately and graceful. Many of them are much alike, but particular varieties are adapted to particular soils and situations. Some are admirably suited for the rock garden.

THE GOLDEN LILY

This is one of the handsome lilies that have come to us from the East. There used to be a belief that the health of the household in whose garden this lily grew corresponded with the condition of the lily.

THE MADONNA LILY

The Madonna is one of the best-known lilies, and also one of the loveliest. It will thrive well for years if left undisturbed in good soil. It was dedicated to the Virgin Mary.

One of the prettiest varieties of the clematis, cultivated as a climber over walls and porches.

THE FLOWERS OF THE GARDEN

CONTINUED FROM 7095

THERE is no such thing in wild nature as a double Rose. All Wild Roses have only five petals, a great number of stamens, and several pistils. The gardener has so coaxed and petted the rose that he has induced it to turn nearly all its stamens into petals, and he has changed its color so often that now we may have roses of almost any tint, from yellow and white and pink to the darkest of purple crimsons. He has been trying for long years to grow a blue rose, but, so far, has always failed.

To-day there are the names of innumerable varieties of roses in the catalogues of the nurserymen. Owing to the fact mentioned, that the "doubling" of the rose has meant the loss of most, or all, of its stamens, these flowers, lovely as we may consider them, are, after all, imperfect flowers. The pistils are mostly there, but if they produce seeds, it is, in most cases, through pollen brought by the bees from wild roses in the fields; so that the seeds grow into plants with flowers more or less like the field rose. Roses like the parent plant can seldom, or never, be raised from seed.

So, when a flower appears that is better than others of that particular kind of rose, the gardener has to cut off the shoot that produced it, and to get it to take root. Then, when it has grown into a little bush, he cuts out a number of the shoot-buds from the stems, and fixes them under the skin of a wild rose, and when the wound has healed and the bud has grown into a shoot, he cuts off all the other shoots and buds of the wild rose, and allows only the new parts to grow. In this way he makes a number of specimens of his new rose out of the one little cutting he induced to root. Some of the shoots he may cause to grow on wild-rose stems, or "stocks," as he calls them, by grafting; by this means all garden roses have to be increased.

One of the most popular of all garden flowers is the Sweet Pea. It grows wild in Sicily, and was first grown in our gardens a little more than two hundred years ago. There is no need to describe the flower, except to point out that its structure is the same as that of the narrow-leaved everlasting pea, and of the broad-leaved everlasting pea of the garden. These, however, are perennials, and bear their flowers in clusters, or racemes; while the sweet pea is an annual, bearing only two or three blossoms on each flower-stalk.

The Carnation, in its wild state, is, of course, always single, and it is a native of the countries around the Mediterranean. It is believed to have been taken to England as far back as the middle of the thirteenth century. Owing to its strong, clove-like scent it used to be called the clove, or clove-pink. As a wild flower its color is always lilac; but by careful selection and crossing between the best of the varieties that appeared in gardens we now have all sorts of tints.

Garden pinks of all kinds are closely related to the proud carnation; so is the old-fashioned Sweet-william, which has broader and greener leaves, and the brilliant Chinese Pink, so frequently grown as a garden annual. The pink and the sweet-william came from Europe long, long ago, and the Chinese, or Indian, pink was brought here from China just about two hundred years ago.

THE GERANIUMS, THE REAL NAME OF WHICH IS PELARGONIUM

Then there are the Geraniums used for bedding in the summer months, but which are too tender to stand our winter climate out of doors. The proper name is *pelargonium,* but the gardener persists in calling it geranium. We have a number of wild geraniums in this country, but no pelargoniums. The latter were introduced from South Africa about two hundred years ago, and have been so changed and improved by crossing that they have little resemblance to the original South African plants. They may be ranked in three distinct classes: the show pelargoniums of our greenhouses, with large, richly colored flowers; the zonal, or bedding, pelargoniums; and the ivy-leaved pelargoniums that look so well trailing over the sides of window-boxes.

THE SWEET STOCKS HAVE BEEN BROUGHT FROM EUROPE

Brompton and Ten-week Stocks are cultivated forms of plants that grow wild in the south of Europe, and they have grown in our gardens for a hundred and fifty years. They are annuals. The Wallflower belongs to the same family—*Cruciferæ*—and is also a European plant; but it has been known in English gardens for over three hundred years. It will not survive a North American winter. Arabis, that produces masses of pure white flowers in early spring on rockeries and in border edgings, is another member of the same family. It was taken to England from the Caucasus a little more than a century ago, and soon was brought across the Atlantic.

MANY FLOWERS BELONG TO THE BUTTERCUP FAMILY

The Buttercup Family has given us many garden flowers, among them all the beautiful forms of Clematis that climb over our walls and porches, covering them with white or purple flowers. One of the best of the white-flowered kinds is the Mountain Clematis from India. The big-flowered purple and blue kinds are cultivated forms of a Japanese species. There are no petals in any clematis, the showiness of the flower being due to the four sepals. The noble Larkspurs also belong to this family.

Often in our gardens we shall find a larkspur with leaves divided into hair-like portions, and with a spike of blue, red or white flowers. This is also a field weed in the east of England. But in larger gardens we shall frequently see a larkspur that towers up to six feet or more, and ends in a long, thick column of brilliant blue flowers. Its parents grew wild in North America a hundred and fifty years ago.

The Christmas Rose is another of the Buttercup Family, nearly related to the wild hellebores. It is no rose at all. Its bold white flowers appear in winter, and so are greatly esteemed. All the brightly colored *Ranunculi,* seen in the flower shops, are true buttercups with larger flowers than any of our wild yellow kinds; they came from Turkey and Persia, where they had been cultivated long before. The garden anemones, too, are relatives.

There are Poppy Anemones also, and Japanese anemones, the latter tall-growing, with handsome leaves and large white or pink flowers. Poppy anemones are real old-fashioned garden flowers, for we have grown them for three hundred years; but the scarlet anemone and the Japanese anemone are quite modern introductions.

Columbine, Monk's-hood and Peony all belong to the Buttercup Family, although they are so unlike in general form. The Columbines come near to the larkspurs. Up to the middle of last century the garden columbines were mostly forms of the European kind, but in later years, owing to the coming of the beautiful long-spurred yellow columbine from California in 1873, a good deal of crossing has taken

place. The peony, though a native of south Europe, was grown in English gardens at least three hundred and fifty years ago. These peonies were the large-flowered, dark crimson kind, and a smaller white-flowered one from Siberia; but toward the end of the eighteenth century the shrubby tree-peony was brought from China and Japan, and became popular on account of its more delicate tints.

THE VIOLETS AND PANSIES OF THE GARDEN

Garden Violets are improved forms of the wild sweet violet, and the Pansies and bedding Violas have been produced from the little wild pansy, or heartsease. Many of the garden violets are double; but the growers of flowers do not appear to have tried to get double pansies—they seem to have tried to keep the flower as flat as possible.

THE FUCHSIA, A NATIVE OF SOUTH AMERICA

Except as a summer bedding plant, the Fuchsia is seen only in gardens in sections where the climate is warm. In California we shall find it is one of the common garden bushes, and it often becomes a small tree. It is a South American plant that was unknown in this country until near the end of the eighteenth century.

THE SWEET OLD-FASHIONED POLYANTHUS AND THE AURICULAS

The Polyanthus is to-day rather a forgotten and neglected flower, but we shall still find it treasured in old-fashioned gardens and in gardens of country houses. It is believed to have had its origin in a crossing of pollen between the primrose and the cowslip. The result is the large flowers of the primrose on the tall flower-stalk of the cowslip, with a greater variety of rich tints than either of its original parents possessed. The Auricula is another kind of primrose that was formerly a great favorite of gardeners. All the many varieties of rich coloring have been produced from the yellow-flowered auricula that grows wild in the Swiss Alps.

Among the wild flowers that have been taken into the garden without its being thought necessary to improve them is the dainty Forget-me-not.

THE SEDUMS, OR STONECROPS, FROM EUROPE

Several wild Sedums, or Stonecrops, of Europe have been admitted into the garden; not only the yellow and white stonecrops, but also the taller crimson-flowered Orpine. A beautiful sedum with bright crimson flowers is the trailing stonecrop from the Caucasus region.

THE THISTLES OF OUR GARDEN BEDS

We have even taken into the garden several Thistles, among them the handsome blue-flowered Globe Thistle from the south of Europe, which has been with us for more than three hundred years. The Cotton Thistle, which is a tall, branching plant, with purple flowers and huge, but handsome, spiny leaves, covered with white cotton-like hairs, is wild in some parts of the country. Another fine thistle is called the Holy Thistle, or Milk Thistle. Its large leaves are marked with white along the midrib.

GREENISH WHITE FLOWERS OF SOLOMON'S SEAL

Solomon's Seal is a real wild flower and is much more frequently seen in our woods than in the garden. It is one of the Lily Family, though its habit is so very different from most of the lilies. Its tall, arching stem, set with a row of leaves on each side, looks more like the frond of some palm. The greenish white, narrow, bell-like flowers present a very singular appearance.

LILIES AND TULIPS FROM FAR-OFF LANDS

The Lily Family figures largely in our gardens, and of the lilies proper we have introduced several. There is, perhaps, none of them so fine as the hardy Madonna Lily, or White Lily. It is wild in the south of Europe. There is also the Tiger-lily, with its dark-spotted, orange-red flowers, that came from China a hundred years ago, from which country and Japan we have received several other lilies.

The strongly scented Japanese Lily, with the golden stripe down the middle of the large white petals, is, perhaps, the favorite, though it is not hardy and can be turned into the garden only in summer. It is usually planted in tubs and grown in the greenhouse, until the flower-buds have formed. This lily was unknown to us fifty years ago.

Very similar, except for the golden stripe, is the Showy Lily, a smaller but more hardy kind that came from Japan nearly eighty years ago. Then there is the Giant Lily, that has large, heart-shaped leaves, and a stem ten feet long that ends

in a cluster of drooping white, trumpet-shaped flowers. The Star of Bethlehem is another plant of the Lily Tribe, which, though a native of Europe, has become naturalized in damp places. It is one of the prettiest of our smaller bulbous plants, its numerous grass-like leaves spreading around a stem crowded with white star-like flowers.

Among other lilies we must not forget the Tulip, of which we have a great number of varieties of diverse forms and colors. Most of them have descended from three wild tulips found in south Europe, Siberia and Asia Minor. The fragrant white Day Lily is from Japan, as well as some of its relatives. The sweet-flowered Lily-of-the-valley is a wild plant of the woods which is much more frequently seen in gardens than outside of them. The stately Red-hot-poker, which makes so fine a display in parks and gardens at the end of summer, is also a lily, coming from South Africa.

HYACINTHS FROM EUROPE AND THE ORIENT

The garden flowers that arise from bulbs, like these lilies, might well take up an article to themselves—they are so many. Many of them are known under the general head of Dutch bulbs. Among these are the wonderful trusses of sweetly perfumed Hyacinth-bells that spring from the onion-like bulb in all sorts of charming tints. The original stock from which all these varieties have been produced is the Oriental Hyacinth, which is wild in Syria.

The Grape-hyacinth belongs to another section of the Lily Family, and grows wild in Europe and the Orient. Instead of the bell-shaped flowers of *the* hyacinth, these are globular, and, as they are dark blue in color, resemble little grapes; so the plant has been called grape-hyacinth. The wild hyacinth, or bluebell, of English woods, belongs to another branch of the family—the Squills. The kind more generally seen in borders is the early-flowering, bright blue Siberian Squill, often planted with a somewhat similar flower called the Glory of the Snow, which came to us from the island of Crete less than fifty years ago.

FLOWERS OF THE AMARYLLIS FAMILY

Another group of bulbous plants comes near to the lilies, but belongs to the Amaryllis Family. Well-known garden examples of this family include the Snowdrop, Narcissus and Belladonna Lily. The snowdrop is commonly grown in gardens, though of late years the larger Elwes snowdrop often takes its place.

This comes from Asia Minor, and has been known to us only since 1875. Of *Narcissi* we have not only the Wild Daffodil and many cultivated improvements of it, but the Jonquil, the Poet's Narcissus, or Pheasant's eye, the Polyanthus Narcissus and a host of others.

THE STATELY IRIS AND GLADIOLUS, AND THE EARLY CROCUS

Then there are so-called bulbous plants whose rootstocks are solid corms, instead of being made up of fleshy scales as the real bulbs are. These belong to the Flag, or Iris, Family, and include the Crocus and Gladiolus. The Iris Family is a huge one, and its members range from tiny little bulb-rooted affairs buried in the baked soil of Africa and Palestine to hurry frantically into bloom in a burst of purple petals and fragrance when moistened by rains, to the English and Spanish Irises, with narrow rush-like leaves which spring from underground corms; from the Bearded Irises with broad sword-like leaves and thick rootstocks that creep along the surface, to the great double flowers that Japanese tend so carefully in their muddy fields, and for which they hold regular festivals for admiring their beauty. It is these Japanese flowers that we see so often painted or carved in Oriental art. The pale purple Florentine Iris is thought to have been the original of the well-known fleur-de-lis—the lily of France—which appeared on the French arms and flag. This flower furnishes, in its root, the perfumed stuff with an odor as of violets, which we call orris root (that is, iris root).

We have a quantity of garden irises growing in dry soil, but practically all of them bear veinings in a different color, or of a different shade from their background, on the lower parts of the perianth called "falls." Sometimes, moreover, there is a "crest," usually yellow or orange, like a narrow brush. This lovely flower is found in almost every marsh as far as the Middle West. Our garden Crocuses are cultivated forms of species found growing wild in the south of Europe and Asia, while the Gladioli originally came chiefly from South America.

THE END OF PLANT LIFE.

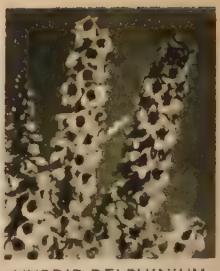
A FINE PLUME OF SPIRÆA

SCABIOUS

BARTONIA

MIGNONETTE

FLEABANE



HYBRID DELPHINIUM

LORD NEVILLE CLEMATIS

POET'S NARCISSUS

DOUBLE CLEMATIS

PINK BEAUTY DAHLIA

DOUBLE TULIP

VERBENA

SNAKE'S-HEAD

HOLLYHOCK

CACTUS DAHLIA

COREOPSIS

GOLDENROD

SINGLE FUCHSIA

IRIS

SINGLE VIOLET

ALLWOODII

OMPHALODES

TULIP

SINGLE DAHLIA

AURATUM LILY

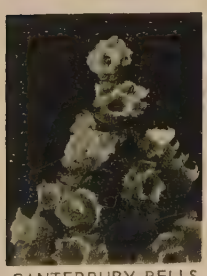
LOS ANGELES ROSE

COLUMBINE

VIOLA

CAMPANULA

PYRETHRUM



CANTERBURY BELLS

MALOPE

RED-HOT POKER.

MADONNA LILY

SWEET PEA

GOAT'S-RUE

MACBETH ROSE

PERENNIAL PHLOX

PINK-PEARL RHODODENDRON

PERENNIAL CORNFLOWER

EDITH JONES DAHLIA

NEMESIA

AN AFRICAN MARIGOLD

BLUSHING-BRIDE ROSE

COLLARETTE DAHLIA

LADY MOND ROSE

GREAT GOLDEN KNAPWEED

CHILDERLEY PRIDE CHRYSANTHEMUM

SINGLE ASTER

TURK'S-CAP LILY

ANNUAL CHRYSANTHEMUM

VIBURNUM PLICATUM

A FINE SPECIMEN OF LYON ROSE

A BORDER CARNATION

WHITETHREAD CHRYSANTHEMUM

PARROT TULIP

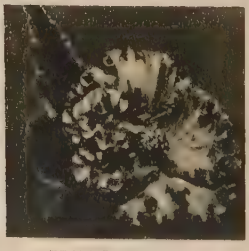
PENTSTEMON

GIANT POLYANTHUS

NEMOPHILA

FOXGLOVE

A TYPICAL ACROCLINIUM



FRILLED BEGONIA

JESSIE MURRAY CARNATION

POMPON DAHLIA

LILY-OF-THE-VALLEY

ANTIRRHINUM

GEORGE MITCHELL PANSY

EMPEROR DAFFODIL

RED HYBRID SUNFLOWER

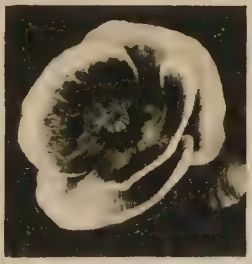
DOUBLE ZINNIA

MICHAELMAS DAISY

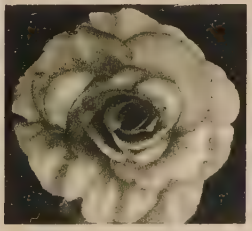
ORNITHOGALUM

PERFECTION STOCK

BUDDLEIA



SHIRLEY POPPY



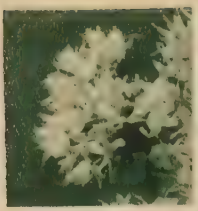
MRS. CAIRNS BEGONIA

CARNATION

OSTRICH-PLUMED ASTER

PEARL HYACINTH

ESCHOLTZIA



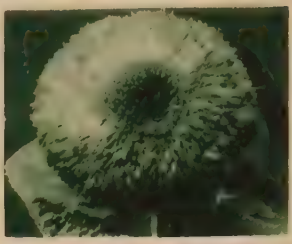
SEDUM

MAMMOTH ASTER

MYOSOTIS

GAILLARDIA

LAVATERA

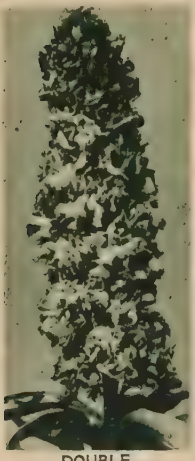


DOUBLE SUNFLOWER

A BURBANK ROSE

CITY OF HAARLEM HYACINTH

VARIEGATED PERIWINKLE



DOUBLE WALLFLOWER

WHITE SPIRAL CANDYTUFT

GRAPE HYACINTH

WINTER ACONITE

LUPIN

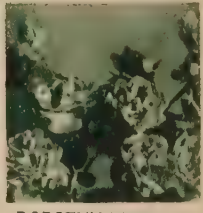
WATER LILY

GODETIA

DOUBLE FUCHSIA

AFRICAN MARIGOLD

GLADIOLUS



DOROTHY PERKINS ROSE

Many of these flowers are from blooms in the famous Sutton Nurseries at Reading, England.

The Aviation Squad of the New York Police Department.

THE STORY OF THE AMERICAN FLAG

CONTINUED FROM 7028

LONG before men had learned to build houses and churches and cities, and long before they knew anything about how to manufacture the bunting and silk of which our flags are made today, they used the skins of animals or the feathers of a bird fastened to a long pole to show the tribe or band to which they belonged, and to signal to one another. Men traveling long distances through the forest knew by this whether they were in the presence of friends or foes.

We find that the Egyptian armies carried standards in battle. These were metal images of birds, animals, fans, boats or simply emblems attached to poles. The Assyrians and the Jews had similar customs. Banners are also mentioned in the Bible. The Greeks carried sacred emblems of metal, while a purple cloth on the end of a spear was the signal to charge.

In the early days of Rome figures of many different animals were carried by different bands, but later the eagle was the only one used; but the Romans also began to use cloth, and the later emperors had a special purple banner. From this time onward the banner became more and more common. Every nobleman had his own, and in some cases the standard of the king became in later times the national flag.

This was perhaps the first use of a flag. When you go to a football game between two great universities or colleges, you know at once by the flags and colors displayed by each team to which side they belong, and when the game is won the winning team rejoices more over the honor of its college and its flag than because of any honor or gain to themselves.

We know to what nation a ship belongs by the flag it displays.

When the President is cruising or traveling in his yacht, the Mayflower, we know, even at a long distance, that it is the President's yacht because it flies his ensign from the mainmast. Important work of the army and navy is done by the Signal Corps with a system of flag signals called wigwagging. The Boy Scouts and Camp Fire Girls know how to talk to one another in this way. Different flags tell us many different kinds of things, but there is one flag which always tells us the same thing, and that is *the flag of our country*.

But there are other thoughts which come to us when we see the splendid colors of our flag—the red, white and blue—streaming in the wind. "Red is for courage, zeal, fervency; white is

for purity, cleanness of life and rectitude of conduct; blue is for loyalty, devotion, friendship, justice and truth."

The star is an ancient symbol of India, Persia and Egypt, and signifies dominion and sovereignty. Even the tassels which hang from the flag and the fringe which surrounds it have a meaning, for they are symbols of a very early rite, and the colors were first used by the Christian Church. But most of all when we see the flag we think of what the men and women of the past have done to uphold its honor and glory, and we vow in our hearts that they shall never grow less.

THE ENGLISH FLAG, THE FLAG OF THE COLONIES

The ancient national flag of England was the cross of St. George in red on a white banner. In 1606 it was united with the white cross of St. Andrew in "the king's colors." This was the "Union" of Scotland and England, which was not finally established until 1707, when this became the official flag and was used until Ireland was united to the kingdom in 1801. Then the red cross of St. Patrick was added to make the present Union Jack. Although the American colonies used the British flag for a hundred and fifty years, none used the present Union Jack, as it was not adopted until after they had gained their independence.

In the early days of the Revolution several states carried special banners. It is said that a flag was carried at Bunker Hill which bore the motto: "Come if you dare." In Trumbull's celebrated picture of the battle the flag is red with a white canton with a green pine tree. Other pictures show a blue flag with a white canton, the cross of St. George and a pine tree. Probably both were used. Connecticut soon raised a flag bearing the arms of the colony, and General Putnam carried a flag bearing on one side the motto of the state: *Qui transtulit sustinet,* which may be translated, "He who brought us here will sustain us." On the other side was: "An Appeal to Heaven." Rhode Island adopted a white flag bearing a blue anchor with the word "Hope," and the blue union carried thirteen white stars.

Soon after arriving in Boston in 1775, Washington purchased several small cruisers to prey upon British commerce. They bore for several months a white flag with a green pine tree and the motto: "An Appeal to Heaven." This, then, seems to have been the first American flag with more than a local meaning. In 1776 it gave way to the "Congress Colors."

THE FIRST AMERICAN FLAG IS ADOPTED

You will find on page 1157 of this work how the thirteen colonies revolted from the mother country and became the thirteen original states of the United States of America. The first official American flag was called the Congress Colors, or the Grand Union Flag, or the Navy Ensign. This ensign was composed of thirteen equal stripes, alternately red and white in color, to signify the thirteen original colonies, and in the upper left-hand corner was a small Jack, the flag of Great Britain, which showed that the colonies still felt their union with the mother country, whose children they were, but children who had grown up into an independence which could not be suppressed by the edicts of an unjust king.

This flag, not the Stars and Stripes, was flown for the first time, December 3, 1775, from the stern of Commodore Hopkins' flagship the Alfred, one of eight vessels bought or built by the Continental Congress. John Paul Jones, America's great naval hero, at that time senior lieutenant, raised the flag with his own hands. Perhaps it was at that proud moment that he exclaimed: "That flag and I are twins. We cannot be parted in life or in death. So long as we can float, we shall float together; if we must sink, we shall go down as one." From the mainmast of the ship Commodore Hopkins hoisted a flag of yellow silk with a coiled rattlesnake and the warning: "Don't Tread on Me." This was called the Gadsden flag because it was presented to Congress by Christopher Gadsden, a delegate to the Continental Congress from South Carolina. The jack hoisted at the same time was alternate red and white stripes with a gliding rattlesnake.

Another rattlesnake flag is described by an English writer: "A separate flag has lately appeared in our seas bearing a pine tree with the portraiture of a rattlesnake coiled up at its roots with this daring motto: 'Don't tread on me.' We learn that vessels bearing this flag have a sort of commission from a society of

people at Philadelphia, calling themselves the Continental Congress." This was a Massachusetts flag, and was flown by the vessels of the navy of that state. At least two other flags showing a rattlesnake were used about that time.

THE BIRTHDAY OF THE STARS AND STRIPES

A month after the Congress Colors were raised on the Alfred they were raised over the Continental army at Boston, January 2, 1776. The flag, however, was never carried in battle. After the Declaration of Independence this flag bearing the British Jack was no longer appropriate, but there seems to have been no other legislation until nearly a year later. On the first real birthday of the Stars and Stripes, June 14, 1777, the Continental Congress passed the following resolution:

"Resolved: That the flag of the thirteen United States be thirteen stripes alternate red and white; that the union be thirteen stars, white in a blue field, representing a new constellation."

It was just at this time that Paul Jones was placed in command of the Ranger, and in November was sent to bear to France the news of the surrender of Burgoyne. The flag which was flown from the staff of the vessel was made, with much excitement and rejoicing, by a group of the girls of Portsmouth, New Hampshire, out of their silken gowns. When the little fleet was in French waters in February, 1778, Admiral La Motte Picquet gave this flag the salute which France accorded to all other republics, which was the first recognition of American independence by any foreign power. A Dutch officer in the West Indies had saluted the colors in 1776, but had been rebuked by his government.

THE MAKERS OF THE FIRST AMERICAN FLAGS

There are many stories as to who was the designer of the first American flag, in which the names of Francis Hopkinson and Captain Paul Jones are mentioned. A commission of three was appointed, consisting of General Washington, Robert Morris and Colonel Ross, to decide upon our national flag. We are told that they consulted with Mistress Ross, a flag-maker who lived in Philadelphia, and that, benefiting by her suggestions, the flag was made from a drawing handed to her by George Washington. The story of Mrs. Betsy Ross is interesting. It is said that she suggested making the stars with five points instead of six, and that she made all the flags for a time. Most students of history do not think that the story is proved, though many people believe it.

An interesting account of the making of the first flag, about which there is no doubt, tells of an attack on Fort Stanwix (later Fort Schuyler, Rome, New York) made by the British, August 3, 1777. Two hundred men of the Massachusetts regiment sent forward to reinforce the garrison brought word of the "flag resolution," and immediately a flag was made, from soldiers' white shirts, the red petticoat of a soldier's wife, and the blue cloak of Captain Abraham Swartout. This is the first occasion when the Stars and Stripes were fired upon.

WHERE THE IDEA OF THE FLAG CAME FROM

It is not known whether the stars were borrowed from the flag of Rhode Island, or whether the idea was borrowed from the Netherlands. It is natural to suppose that our forefathers may have been influenced by the flag of Holland, to whom they were so much indebted, and it is also quite possible that the stripes and stars upon Washington's own coat of arms may have suggested the stars and stripes of our flag.

It does not really make much difference where the idea of the flag came from. The stripes were used, as we have seen, long before the stars were adopted, and the stars were on the Rhode Island flag. Perhaps the idea did come from Washington's coat of arms, but it seems more likely that the flag simply grew, and that no one person is really responsible.

THE FLAG ONCE BORE FIFTEEN STARS AND STRIPES

When the new states Vermont and Kentucky entered the Union, two new stars and stripes were added to the flag by act of Congress, to take effect May 1, 1795. The circle of stars was replaced by five stars in three parallel rows. This was the flag which was flying over Fort McHenry at Baltimore twenty years later when the British bombarded it, September 14, 1814. The states admitted immediately after Kentucky were not represented upon the flag, and they demanded that they be given a place also. However, no change was made for years.

It is plain that the addition of a new stripe for each new state which entered the Union would make the stripes too narrow, and on April 4, 1818, Congress enacted that the stripes in the flag should be always thirteen in memory of the thirteen original colonies, and that each new state should be represented by a new star added to the flag on the Fourth of July following the admission of the state to the Union. There were twenty states then. At the time of the Revolution the flag had 13 stars; of the Mexican War, 29; of the Civil War, 35; of the Spanish-American War, 45; and the number to-day is 48. So you see that the arrangement of the stars has been frequently changed as the number of the states has increased.

Each state now has its own flag, though in a few cases the flag has not been officially adopted by the legislature. During the Revolution and the War of 1812 troops fought under the state flags, though they were not the flags in general use to-day. It was not until the war with Mexico in 1846 that our national standard was regularly carried into battle.

Most of the present state flags, even of the older states, are not more than fifty years old. Some are very attractive, though many are very much alike. Many states use the seal of the state on a blue ground as the state flag. Unless one looks very closely it is difficult to tell them apart. Other states use different colors as a background, and still others have different arrangements of stars, stripes and devices. You should know your own state flag.

THE NAMES BY WHICH OUR FLAG IS CALLED

There should not be a child anywhere in the United States who does not know how and when our national song, which gave the name to our flag, The Star-Spangled Banner, came to be written. Francis Scott Key, a statesman and attorney of Maryland, living in Baltimore at the time the British bombarded Fort McHenry, was asked by President Madison to secure the release of a certain Dr. Beans, who was being held on unjust charges. He went on board the Minden for this purpose, and was held overnight during the bombardment. In the morning, when he saw the flag was still flying, inspired by the intense feelings of that hour, he wrote the first draft of our national song. The Star-Spangled Banner still floats over his grave in silent majesty.

But the name which we love best for our flag is "Old Glory," and it is said that the man who gave this name was Captain Stephen Driver, who was in command of the Charles Doggett, sailing from the port of Salem, Massachusetts. No man loved the flag of the Union more than Captain Driver, and when he first sent it aloft he christened it "Old Glory," which he called it ever after, so that he came to be spoken of as "Old Glory Driver." After his death in 1886 it was presented to the Essex Institute of Salem, the same port from which it sailed away so proudly in 1831.

THE USE OF THE COLORS AND THE STANDARDS

In the United States Army a distinction is made between colors and standards. Mounted troops carry standards, while unmounted troops carry the colors. Standards are smaller and have no cords and tassels, which are usually attached to the colors. It is easy to see why the mounted troops have the smaller flags, without the cords and tassels which would hamper the men who bear them in going into action. If you have ever been to West Point to see that wonderful review of the cadets, you will remember how the colors are escorted to and from the field by a special color guard.

At military posts The Star-Spangled Banner is played at the raising and lowering of the colors, morning and night. When not in use they are kept at the quarters of the colonel, and when in camp are set up in front of the colonel's tent—the national color or standard on the right as you face outward, the left as you approach. Each regiment has both a national and a regimental silk standard or color, and a battalion or squadron has, in addition, the same flag made of bunting, of a larger size.

Our flag is the oldest national flag in existence except that of Denmark. It is older than the flag of Great Britain, adopted in 1801, than the flag of Spain, 1785, than the French tricolor, 1794, than the flag of Portugal, established in 1830, and the flag of the German Reich. It is older than the Swedish or the Norwegian ensigns, or the recent flags of the old empires of China and Japan, or the flags of South America.

THE YOUNG CITIZEN AND HIS FLAG

YOU have many times seen the flag of your country hanging from its staff or waving proudly in the breeze. You say that it is your flag, but have you ever stopped to think what it means? Your country's flag! Do you think of it simply as a bit of colored cloth, or do you have for it a deep devotion which you cannot find words to express? Perhaps you have never thought of it at all.

The flag of your country stands for the country itself. We say that the "Stars and Stripes" is the symbol of the nation to which we belong. All those who have gone before have helped to make the nation what it is, and hence have helped to make the flag. While the Indian and the wild beast still held possession of our land, men on the other side of the ocean were making the flag of the United States. The spirit of those who wished to be free from the bonds of Europe and were willing to risk their all to build homes in a new land is the very basis of the flag.

WHAT DOES THE FLAG OF THE UNITED STATES STAND FOR?

The flag of the United States stands for the first settlers who left their homes and came across the seas to hew out homes in the wilderness. It stands for the hardships of Jamestown and Plymouth; it stands for the hardy pioneers who climbed the Alleghenies and began to conquer the boundless West; it stands for the Declaration of Independence; it stands for Concord and Lexington, Valley Forge and Yorktown; it stands for those who formed and guided the new government—Washington and Adams, Hamilton and Jefferson, Madison and Marshall, and hundreds of others; it stands for all those who died to make this land free. All the blood and treasure which have been poured out to make this a land of liberty and opportunity are a part of this flag.

The flag means the nation which guards and protects you. Perhaps you have never thought that you have anything to do with the nation. Perhaps it always seemed far away. The policemen, the firemen and the street-cleaners you see almost every day, and you may have thought of them as all of the government. They are a part of the city or town, but they are not all, even of that. The city, the town and the county are parts of the state, and the state is a part of the nation, and the nation means more than a few officers.

WHAT DO WE REALLY MEAN BY THE NATION?

The nation is all the people of your country acting together. It is not something far above you which you must obey and with which you have nothing to do. The nation is you, your father and your mother, your brothers and sisters, the people around you, and the people far away, in Maine or California, Florida or Idaho, all those who live under the flag and love it. All of them help to make up the nation as it is to-day, and it is what it is because of them and because of those who have gone before.

Have you ever thought how impossible it would be for you to live alone, how difficult and inconvenient it would be if your own family lived apart from everyone else? You would have to do without most of the things which make life pleasant. Your family could not build roads and bridges, could not keep up schools, and could not protect itself from any wicked men who might roam through the land or might come from afar. Only all the people can do that, and we call them, acting together, the State.

For you policemen walk the streets, firemen are always ready to save you, doctors are trying to make the land healthful, brave soldiers and sailors are guarding the coasts. Thousands of men, and women, too, are working for you, and other young citizens like you—working to make this world a better place for you to live in, working to give you a better opportunity to grow up strong, healthy and wise.

WHY THE AMERICAN FLAG MEANS SO MUCH

All of these are a part of what the flag means. It is a flag which floats over a free nation, where the will of the citizens is the law of the land. In some countries the national flag is the flag of a few who enjoy the good things of life, while the great majority must live without opportunity. Here the poorest boy may rise to the highest position in the nation. Many have already done so; many more will do so in the years to come. No law will keep him down. No law will inter-

fere with his religion. No one will decide where he must work and what he must do. The long arm of the government will protect him while he is doing right.

The flag of the United States has brought hope to those who were oppressed. Under that flag men went forth to free Cuba from tyranny, and then to free the world from dread. Under it the Filipino, the Hawaiian and the Porto Rican are able to live secure, and the flag will protect you if it takes the whole strength of the nation to drive off those who strive to oppress you.

RIGHTS, PRIVILEGES AND DUTIES ARE ALL CONNECTED

Now, every right or privilege carries a duty with it. You say that you have a right to walk along the street without harm, that you have a right to the cap on your head. This is true, but have you ever thought that if it is your right to walk in peace, it is your duty not to interfere with another? If it is your right not to have your cap snatched from you, it is your duty not to snatch the cap of anyone else. If the public library offers you books to read, it is your duty not to tear or deface them. The other side of every right or privilege is a duty, and one who is always demanding his rights and never thinks of his duties is either stupid or selfish, or both.

Boys and girls do not always understand this fact, which is at the very foundation of all society. They desire every good thing of life and expect it to come to them, but they forget that they must give in return. They expect their parents, the city, the state to give them everything they may desire, and never think that they owe something in return to all of these. One who always takes and never gives is not an admirable person. You despise such a boy or girl, if you are unfortunate enough to know one of this sort.

HOW YOU CAN SHOW YOUR LOVE FOR THE FLAG

Then, if the nation protects, guards and helps you, it is your duty to conduct yourself properly. Every time you do something you know to be wrong you are dragging the flag of your country in the dust. You are being ungrateful to the nation of which you are a part. By just a little bit you are lowering the standard of the whole nation. You are making the United States just a little worse. You are making it harder for the nation to do the work it must do.

Not doing wrong is not enough. A stump does not do anything that is wrong, but it is not likely to do much that is good either. A citizen who loves his nation must be on the lookout to do good, and not simply to keep from doing wrong. He must be active all the time and try to make himself more worthy than he was the year before, or even the week before. If you are to be worthy of the flag you must be a good citizen, and a good citizen is not one who sits still and does nothing. Everyone who does not help, hinders, for he is simply a dead load which those who are trying to carry the nation forward must lift. Someone said that people could be divided into those who lift and those who lean. By lifting instead of leaning you can show your love for the flag.

You may say that one person in a hundred million does not matter. This is a very foolish statement. The nation is made up of more than a hundred million people, to be sure, and many of them are boys and girls like you. If every boy or girl had the same ideas and grew up into a selfish, lazy man or woman, what kind of nation would we have? How long would the United States be one of the leading nations of the world? Soon the world would learn to know that nothing high or noble was to be expected from the United States. It would be a dead nation, with no right to exist upon the earth.

Few boys and girls really mean to be bad. Generally it is thoughtlessness, or ignorance, or laziness which makes them a hindrance to the happiness or the welfare of the home, the school or the community. Fortunately every boy or girl can correct these failings if he or she chooses. None of them is necessarily permanent. On the other hand, if unchecked, they may easily lead to more serious vices and destroy all hope of future usefulness.

Think of your flag as the symbol of your nation. Show reverence for the flag because it represents the nation, which has done so much for you and the world. Then, when you grow up and can have a voice in the nation's affairs, you will, I am sure, be a good citizen. In the United States there can be no higher title of honor than this.

THE ETIQUETTE OF THE FLAG

THERE are certain rules in our conduct toward the Flag which should be followed. Below are given the rules which are drawn from the code adopted by the National Flag Conference.

1. The Flag should be displayed only from sunrise to sunset, or between such hours as may be designated by proper authority.
2. When carried in a procession with other flags, the Flag should be either carried upon the marching right or in advance of the other flags in the centre.
3. When displayed on a staff against a wall with another flag, the Flag should be on its own right (the left as you look at it) with its staff in front of the other staff.
4. When displayed in a group of state or city flags, the Flag should be in the centre or at the highest point.
5. If more than one flag is flown on a staff, the Flag should be uppermost.
6. When suspended over a sidewalk, the Union should be outward.
7. When displayed flat against a wall or in a window, the Union should be uppermost and to the observer's left.
8. When displayed over a street, the Union should be to the North in an east-and-west street and to the East in a north-and-south street.
9. When used in a church or hall, note the following rules:
   a. If displayed flat, the Flag should be above and behind the speaker, never draped over the desk.
   b. If displayed from a staff on the platform, it should be placed at the speaker's right.
   c. Flags carried by the congregation or audience should be placed upon their right.
10. The Flag is flown at half-staff to indicate mourning. It should, however, be raised to the peak for an instant in the morning, and again before lowering at night.
11. When used to cover a casket, the Union should be arranged to cover the left shoulder.
12. When a Flag is no longer in condition to be flown, it should be destroyed privately and never thrown away.

THINGS NOT TO DO

ABOVE you are told what you should do with the Flag. Here are some things you should not do.

1. Do not permit disrespect to be shown to the Flag.
2. Do not dip the Flag to any person or any thing.
3. Do not place any other flag above the Flag of the United States.
4. Do not use the Flag to cover a statue or monument to be unveiled.
5. Do not let the Flag touch the ground or floor, or trail in the water.
6. Never use the Flag to cover a table or a desk or as drapery. Use bunting of blue, white and red, and place blue uppermost.
7. Do not drape the Flag over the sides or back of a vehicle or boat.
8. Do not use the Flag as part of a costume or an athletic uniform.
9. Do not put lettering of any kind on the Flag.
10. Do not use the Flag in any form of advertising.
11. Do not display, use or store the Flag so that it may be easily soiled or damaged.

THE MAKERS OF THE FLAG*

THIS morning, as I passed into the Land Office, The Flag dropped me a most cordial salutation, and from its rippling folds I heard it say: "Good morning, Mr. Flag-maker."

"I beg your pardon, Old Glory," I said, "aren't you mistaken? I am not the President of the United States, nor a member of Congress, nor even a general in the army. I am only a government clerk."

"I greet you again, Mr. Flag-maker," replied the gay voice; "I know you well. You are the man who worked in the swelter of yesterday straightening out the tangle of that farmer's homestead in Idaho, or perhaps you found the mistake in that Indian contract in Oklahoma, or helped to clear that patent for the hopeful inventor in New York, or pushed the opening of that new ditch in Colorado, or made that mine in Illinois more safe, or brought relief to the old soldier in Wyoming. No matter; whichever one of these beneficent individuals you may happen to be, I give you greeting, Mr. Flag-maker."

I was about to pass on, when The Flag stopped me with these words:

"Yesterday the President spoke a word that made happier the future of ten million peons in Mexico; but that act looms no larger on the flag than the struggle which the boy in Georgia is making to win the Corn Club prize this summer.

"Yesterday the Congress spoke a word which will open the door of Alaska; but a mother in Michigan worked from sunrise until far into the night to give her boy an education. She, too, is making the flag.

"Yesterday we made a new law to prevent financial panics, and yesterday, maybe, a school teacher in Ohio taught his first letters to a boy who will one day write a song that will give cheer to the millions of our race. We are all making the flag."

"But," I said impatiently, "these people were only working!"

Then came a great shout from The Flag:

"The work that we do is the making of the flag.

"I am not the flag; not at all. I am but its shadow.

"I am whatever you make me; nothing more.

"I am your belief in yourself, your dream of what a people may become.

"I live a changing life, a life of moods and passions, of heart-breaks and tired muscles.

"Sometimes I am strong with pride, when men do an honest work, fitting the rails together truly.

"Sometimes I droop, for then purpose has gone from me, and cynically I play the coward.

"Sometimes I am loud, garish, and full of that ego that blasts judgment.

"But always I am all that you hope to be and have the courage to try for.

"I am song and fear, struggle and panic, and ennobling hope.

"I am the day's work of the weakest men and the largest dream of the most daring.

"I am the Constitution and the courts, statutes and the statute-makers, soldier and dreadnought, drayman and street sweep, cook, counselor, and clerk.

"I am the battle of yesterday and the mistake of to-morrow.

"I am the mystery of the men who do without knowing why.

"I am the clutch of an idea and the reasoned purpose of resolution.

"I am no more than what you believe me to be and I am all that you believe I can be.

"I am what you make me; nothing more.

"I swing before your eyes as a bright gleam of color, a symbol of yourself, the pictured suggestion of that big thing which makes this nation. My stars and my stripes are your dream and your labors. They are bright with cheer, brilliant with courage, firm with faith, because you have made them so out of your hearts; for you are the makers of the flag, and it is well that you glory in the making."

* Delivered by the late Franklin K. Lane (died 1921), when Secretary of the Interior, on Flag Day, 1914, before the employees of the Department of the Interior, Washington, D. C. By special permission of Mr. Lane.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 7225.

FLAGS OF THE UNITED STATES

On these four pages are some of the flags used by different individuals, organizations and departments of the national government, the flags of the states, some historical flags, and finally, the flag which belongs to all of us.

NATIONAL FLAG & ENSIGN

FLAG OF THE PRESIDENT

SECRETARY OF WAR

SECRETARY OF THE TREASURY

ASSISTANT SECRETARY, TREASURY

SECRETARY OF THE NAVY

SECRETARY OF COMMERCE

ADMIRAL SENIOR

ADMIRAL JUNIOR

VICE-ADMIRAL

JACK

REAR-ADMIRAL

COMMODORE

SENIOR OFFICER

NAVAL ARTILLERY ASHORE

NAVAL INFANTRY ASHORE

NAVAL MILITIA

LIEUT.-GENERAL

MAJOR-GENERAL

BRIGADIER-GENERAL

CONSULS

CAVALRY STANDARD

FIELD ARTILLERY STANDARD

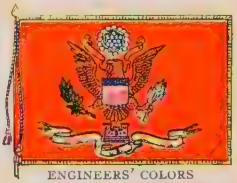
MOUNTED ENGINEERS' STANDARD

SIGNAL CORPS STANDARD

CHIEF OF STAFF COLORS

INFANTRY COLORS

COAST ARTILLERY COLORS

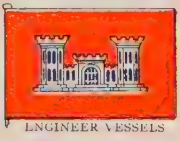

ENGINEERS' COLORS

TRANSPORT SERVICE

MINE PLANTER

NAVAL RESERVE

ORDNANCE VESSELS


ENGINEER VESSELS

ASSISTANT SECRETARY, NAVY

ASSISTANT SECRETARY, COMMERCE

MARINE CORPS

MAJOR-GENERAL MARINES

BRIGADIER-GENERAL MARINES

HARBOR DEFENSE COMMANDER

COMMISSIONER OF NAVIGATION

BUREAU OF NAVIGATION

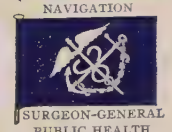
COMMISSIONER OF FISHERIES

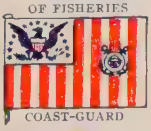
BUREAU OF FISHERIES

COMMISSIONER OF LIGHTHOUSES

BUREAU OF LIGHTHOUSES

PUBLIC HEALTH SERVICE


SURGEON-GENERAL PUBLIC HEALTH


COAST-GUARD

COAST-GUARD JACK

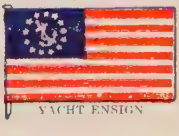
COAST-GUARD ANCHORAGE

POWER SQUADRONS

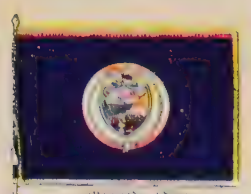
CUSTOMS

SUPERINTENDENT COAST SURVEY

COAST SURVEY


YACHT ENSIGN

The first thirteen flags are arranged in the order in which the states they represent ratified the Constitution. The remaining thirty-five (from Vermont through Arizona) are arranged in the order in which the states they represent were admitted to the Union.

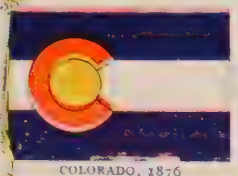

OREGON, 1859

KANSAS, 1861

WEST VIRGINIA, 1863

NEVADA, 1864

NEBRASKA, 1867


COLORADO, 1876

NORTH DAKOTA, 1889

SOUTH DAKOTA, 1889

MONTANA, 1889

WASHINGTON, 1889

IDAHO, 1890

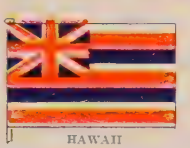
WYOMING, 1890

UTAH, 1896

OKLAHOMA, 1907

NEW MEXICO, 1912

ARIZONA, 1912


HAWAII

PHILIPPINE ISLANDS

MINDANAO & SULU

GOVERNOR OF PANAMA CANAL ZONE

HISTORICAL FLAGS OF THE UNITED STATES

HUDSON'S FLAG, 1609

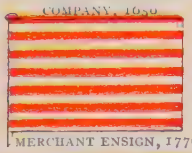
DUTCH WEST INDIA COMPANY, 1650

BUNKER HILL, 1775

ENSIGN WASHINGTON'S CRUISERS, 1775

LIBERTY TREE, 1776

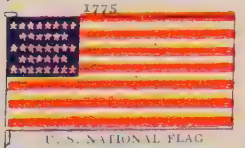
FIRST NAVY ENSIGN, 1775


MERCHANT ENSIGN, 1776

FIRST "STARS & STRIPES," 1777

"STAR-SPANGLED BANNER," 1795

NATIONAL FLAG, 1813


U. S. NATIONAL FLAG CIVIL WAR

U. S. INFANTRY REGIMENTAL, CIVIL WAR

U. S. ARTILLERY NATIONAL—CIVIL WAR

CONFEDERATE "STARS & BARS," 1861

CONFEDERATE JACK, 1861

CONFEDERATE NAVAL ENSIGN, 1862

CONFEDERATE BATTLE FLAG 1861, & NAVY JACK, 1863

CONFEDERATE BATTLE FLAG, 1863

CONFEDERATE NATIONAL FLAG, 1863

CONFEDERATE NATIONAL FLAG, 1865

The date of the admission of the state does not indicate the age of the flag, as many have been adopted only recently.

THE UNITED STATES FLAG

On June 14, 1777, Congress adopted a flag of thirteen stripes, alternately red and white, with thirteen stars in a blue field. On January 13, 1794, after the admission of Vermont and Kentucky, it was provided that after May 1, 1795, the flag should consist of fifteen stripes with the same number of stars. No other change was made until 1818. Then, April 4, it was decided to reduce the number of stripes to thirteen with twenty stars, the number of states then in the Union, and that on the Fourth of July following the admission of a state a new star should be added. On July 4, 1912, the stars representing New Mexico and Arizona, the last states admitted, were added.

By courtesy of the
United States Flag Association

THE AMERICAN FLAG

I

WHEN Freedom, from her mountain height,
Unfurled her standard to the air,
She tore the azure robe of night,
And set the stars of glory there;
She mingled with its gorgeous dyes
The milky baldric of the skies,
And striped its pure, celestial white
With streakings of the morning light;
Then, from his mansion in the sun,
She called her eagle-bearer down,
And gave into his mighty hand
The symbol of her chosen land.

V

Flag of the free heart's hope and home,
By angel hands to valor given;
The stars have lit the welkin dome,
And all thy hues were born in heaven.
Forever float that standard sheet!
Where breathes the foe but falls before us,
With Freedom's soil beneath our feet,
And Freedom's banner streaming o'er us?

—JOSEPH RODMAN DRAKE (1795-1820)

Photo, Underwood & Underwood.
Theodore Roosevelt's Grave at Oyster Bay, Long Island.

SOME OTHER FAMOUS PRESIDENTS

CONTINUED FROM 7124

TWENTY-NINE men have filled the office of president of the United States. Four vice-presidents—Tyler, Fillmore, Johnson and Arthur—who succeeded to the office on the death of the presidents with whom they had been elected were not continued in their high position by election. Two others, Roosevelt and Coolidge, filled out unexpired terms and then received the honor of an election by the people.

Some of our presidents have been men of great ability; others were ordinary men who were nominated or elected almost by accident. Some of our greatest men with the largest number of followers failed for one reason or another to gain the desire of their hearts. Webster, Clay, Calhoun, Benton and Douglas all failed of election before the War between the States. Horace Greeley, James G. Blaine and William J. Bryan, who had thousands of enthusiastic admirers, failed in later years.

All our presidents have been men of high character, though some were wiser than others. Some lacked the ability to manage men and did not have successful administrations on that account. Unfortunate circumstances interfered with the popularity of others. We can be proud, however, that in the long line there has not been a bad man or one who did not prize the welfare of his country. Of no other list of so many rulers in any other nation can this be said.

We have already told you of the lives of five, in the chapter beginning on page 1039. The last one of them went out of office in 1877. In the time since eleven men have held the high office. Nine of them are dead, and we can now begin to form some estimate of them. Historians are agreed that three stand out above the others. They are Grover Cleveland, Theodore Roosevelt and Woodrow Wilson.

On March 18, 1837, a baby boy was born in the house of a Presbyterian minister in the town of Caldwell, New Jersey, and was baptized Stephen Grover Cleveland. His father, Richard Cleveland, was an educated man, a graduate of Yale College. His mother, Ann Neal, was a native of Baltimore and a woman of high character and much charm. Four years later the family moved to Fayetteville, New York, and lived there for ten years.

There were nine children to be supported upon a small salary, for the father never received more than a thousand dollars a year. In the home were no luxuries, but the children were brought up in an atmosphere of obedience, learning and religion. The Sabbath was strictly kept, and attendance at church and Sunday school was required.

Young Grover learned Latin and mathematics well, but he never was a brilliant student, either at Fayetteville or at Clinton, where the family moved in 1851, when he was fourteen years of age. Hamilton College is in this town, and the boy expected to enter as soon as he was prepared. However, it seemed necessary that he should earn money. So he returned to Fayetteville and worked in the village store for two years. For the first year he received his board and lodging and fifty dollars in cash; the second year he received a hundred dollars.

© Underwood and Underwood.
One of the features of his life at Princeton which Mr. Cleveland enjoyed most was the opportunity of making comrades of his children. The son is now a Princeton graduate.

Just as he was resuming his preparation for college his father died, and the dream of college was given up. For a year he taught in a school for the blind, but did not like the work. He could not find any other employment, and borrowed the money to go to Cleveland, Ohio, named for one of his relatives. At Buffalo, where an uncle lived, he was offered employment and began to study law in an office. He had no instruction. The law books were there, but he had to dig everything out himself. Here he developed that stubborn perseverance for which he was noted later.

In 1859, when twenty-two years of age, he was admitted to the bar, and four years later he was made assistant district attorney. For two years he held this office and then went back to private practice. People trusted him, and in 1870 the Democratic party nominated him for the office of sheriff because they thought him the only man who could be elected. He was elected and was a good officer.

In 1881 he was elected mayor of Buffalo, and at once attracted attention by his demand that the business of the city should be honestly and economically conducted. He vetoed many bills and stopped several corrupt schemes. The people believed in him, and in 1882 chose him for governor of New York by the largest majority ever known up to that time. At Albany he was the same man he had been in Buffalo—honest, industrious and fearless—and people all over the United States began to hear of the honesty and the wisdom of the bachelor governor of New York. He made some enemies, but more people admired him.

In 1884 the Democratic Convention in Chicago nominated Grover Cleveland for president on the second ballot. The Republican nominee was James G. Blaine, and the campaign which followed was fiercely fought. Mr. Cleveland carried New York by a narrow majority, and this gave him the election—the first Democratic president chosen in twenty-eight years.

The president showed in Washington the same qualities he had displayed at Buffalo and at Albany. His position was difficult. The Democrats had been out of office for a long time: practically every

HOMES OF TWO DEMOCRATIC PRESIDENTS

Woodrow Wilson was born December 28, 1856, in the manse (pastor's house) in the town of Staunton, Virginia, where his father, the Reverend Joseph R. Wilson, was pastor of the Presbyterian Church. Staunton is a beautiful town in the Shenandoah Valley, and is a pleasant place of residence.

Grover Cleveland bought the house at Princeton, New Jersey, before the completion of his service as president, and spent the last eleven years of his life here. It is a roomy, comfortable home, but in no sense a mansion. The years Mr. Cleveland spent here were the happiest of his life.

Photos, Underwood & Underwood.

office was filled by a Republican. The president was urged to "turn the rascals out," and give all offices to Democrats. On the other hand, it was his belief that fitness should be the chief test for appointment, but he did feel it to be wrong that half the people should have no part in the government. In his attempt to steer a middle course the president pleased neither Democrats nor Republicans.

President Cleveland was a hard worker. He was never satisfied to sign a paper until he knew all the facts, and the light in his study burned until late in the night. He did not hesitate to veto bills if he suspected or disapproved them, and in this way he made many enemies.

Then came the question of the tariff. The rates of duty on foreign goods were high and brought in more money than was needed to run the government. President Cleveland was convinced that this was wrong and advocated lowering the tariff, but the Senate was Republican and refused to consent. Many of his own party were not in favor of tariff reduction, but in 1888 President Cleveland was renominated. At the election Benjamin Harrison, the Republican candidate, received a majority of the electoral vote, though Mr. Cleveland had a majority of the popular vote.

Mr. Cleveland, now a private citizen, removed with his family to New York and returned to the practice of law. On page 396 we tell you of his marriage to Miss Frances Folsom. He was glad to be free from office, but it was soon clear that the people of the United States were not through with him. In 1892 he was again nominated for the presidency and elected. This is the only time in our history that a president has served two terms not in succession.

His second term was unfortunate. There was a great panic in 1893 and times were very hard. Many factories were closed and many men were out of work. The farmers could not sell their produce for what it had cost them. In their despair they turned on the president and held him responsible for their ills. When he left the presidency in 1897 he felt that he was the most unpopular man in the country.

He had already bought a house at Princeton, New Jersey, and lived there until his death. He enjoyed the life of the university town and made many friends. Every year he lectured to the students, and was much liked by them. He was fond of fishing and hunting, and continued to enjoy these sports until near the end of his life. Occasionally he wrote an article for a magazine, though writing was always a task for him.

He was to perform one more public service before his death. Some of the great life-insurance companies had been extravagantly managed, and public confidence was shaken. Mr. Cleveland was made one of the trustees to transfer the management of one company to the policy-holders, and also acted as referee in differences which arose between several companies.

Mr. Cleveland lived more than eleven years after leaving Washington, and these were probably the happiest years of his life. He saw his popularity return among thinking people, he enjoyed his home and loved to see his children growing up around him. When he died, on June 24, 1908, the nation mourned.

THEODORE ROOSEVELT, THE DELICATE BOY WHO GREW STRONG

In 1644 one Claes van Roosevelt came from the Netherlands to the little town growing up at the foot of Manhattan Island. There his descendants continued to live and prosper as the town grew into the city of New York. One of them, Theodore, married Martha Bullock, of Georgia. One of their four children, also called Theodore, the future president, was born October 27, 1858, in the family home, 28 East Twentieth Street, which is now a memorial museum.

The boy was delicate almost from birth, and attended school very little, but his father's wealth provided the best of private tutors and the opportunity of travel in Europe. From boyhood the boy was interested in natural history, and seriously considered preparing himself to be a college professor. His father fitted up a gymnasium in the home, and the boy worked hard to strengthen his frail body. He improved so much that he was able to enter Harvard College in 1876, and graduated with honors four years later. While in college he continued to work at strengthening his body as well as his mind. He was always fond of hunting, horseback-riding and other outdoor sports.

Soon after leaving college he married Miss Alice Lee, of Boston. There was

no need for him to work for a living, as his father had left him a comfortable fortune, but he could not be idle and began the study of law and also worked upon a History of the Naval War of 1812. He was offered the Republican nomination for member of the Assembly in 1881, was elected and served three years. While in Albany he attracted much attention by his courage and his independence.

Just now his mother and his wife both died. He determined to leave public life: in 1884 went to northern Dakota, where he had an interest in two cattle ranches. For two years he remained at the Elkhorn Ranch at Medora, working, hunting and taking part in the primitive life of the region. While still on the ranch he was nominated for mayor of New York, but was defeated. After the election he went to Europe and married in London a playmate of his childhood, Miss Edith Kermit Carow. On his return to the United States he settled at his country place, Sagamore Hill, at Oyster Bay, Long Island, which was his real home until his death. For a time he gave himself to writing history, biography and his hunting experiences.

In 1889 President Harrison appointed him to the United States Civil Service Commission, in which he served six years. Then he was a police commissioner in New York City, and did much to expose and correct corruption in the police force in the city by methods which attracted much attention and made his name known all over the United States.

On the election of President McKinley he was appointed assistant secretary of the navy, and here his energy did much to prepare the navy for the war with Spain which he believed was coming. As it drew nearer he resigned from the Navy Department and became lieutenant-colonel of the First Volunteer Cavalry, soon nicknamed the "Rough Riders." This was made up of men who could ride and shoot—cowboys, ranchmen and hunters from the West, with a few college men from the East. His dear friend Dr. Leonard Wood, now General Wood, was colonel.

A whole book has been written about the Rough Riders. In Cuba the regiment saw some sharp fighting under the command of Colonel Roosevelt, for Colonel Wood had been promoted. The reputation he won in Cuba led to his nomination for governor of New York in 1898, and he was elected, but soon quarreled with the party leaders in the state, who determined to nominate him for vice-president in 1900. He was too popular to drop, but in the vice-presidency he would be out of their way.

Rather against his will Governor Roosevelt became Vice-President Roosevelt, but was never called upon to preside over the Senate. On the death of President McKinley in September, 1901, he became president, with nearly three and a half years to serve before the next election. He was the youngest man who ever served as president.

The birthplace of Theodore Roosevelt in New York City. Photo, courtesy Roosevelt House.

No president has ever been busier during his service. The story of the seven and a half years—for he was elected for a full term in 1904—is too long to tell. He started the Panama Canal, he made peace between Russia and Japan, he prosecuted the trusts, he settled the great coal strike, he urged the conservation of natural resources, he took an active part in foreign affairs, and did dozens of other things. At the end of his term he and his son Kermit spent a year in Africa collecting big game for the Smithsonian Institution. On his return through Europe he was received with great honors, and made several important speeches which were read all over the world.

President Taft had been nominated and

elected largely through the influence of President Roosevelt. When the latter returned from Africa his friends informed him that Mr. Taft had not continued his policies, but had favored his opponents in the party. From every side came the demand that he should become a candidate in 1912. Finally he agreed, but so many of the delegates had already been chosen that his friends were at a great disadvantage. There were many contests in the convention, and it was soon plain that the result depended upon which of the contesting delegates were seated. The

Photo, Underwood & Underwood.
Woodrow Wilson became Professor of Government at Princeton in 1890 at the age of thirty-four, and this picture was made soon after.

convention decided for the most part in favor of the Taft delegates, and many of Mr. Roosevelt's friends refused to remain in the convention.

Six weeks later a new convention met and organized the Progressive party. Mr. Roosevelt was nominated, of course, and began a hard campaign. While in Milwaukee he was shot, but not seriously injured, by a lunatic. With three candidates in the field, Woodrow Wilson was easily elected, though the popular vote of Taft and Roosevelt together was much greater.

Next Mr. Roosevelt and his son Kermit made an exploring trip to South America, visiting some parts not before seen by white men. While here he was attacked by fever and came near death. In fact, he never really recovered, and the trip shortened his life.

The last years of his life were busy. He wrote books, magazine articles and editorials for a newspaper, and continued to spend much time out of doors. He wished the United States to enter the World War almost as soon as it began, and was very impatient with President Wilson's conduct of affairs. When the United States did join it he asked to be permitted to lead a volunteer force, but the request was denied. His four sons enlisted, and one was killed. Meanwhile he was far from well, and on the day of the armistice he went to a hospital and on January 6, 1919, he died in his sleep. He was buried in the cemetery at his beloved Oyster Bay, and every year thousands visit his grave.

WOODROW WILSON, THE SCHOLAR IN THE PRESIDENCY

Woodrow Wilson, like Grover Cleveland, was the son of a Presbyterian minister. His father, Joseph R. Wilson, was born in Ohio, and spent part of his life as a college professor and the remainder in the ministry. His mother, Janet Woodrow, was the daughter of a Scotsman who was a distinguished Presbyterian minister in Ohio.

On December 28, 1856, while his father was pastor at Staunton, Virginia, the future president was born and christened Thomas Woodrow in honor of his mother's father. While at college he dropped the first name and was known afterward as Woodrow Wilson. There seems to be little to tell of his childhood, which was spent in Augusta, Georgia, and Columbia, South Carolina. The boy was not strong, and much of his teaching came from his father.

Of course, it was expected that he go to college. So in 1874 he entered Davidson College, North Carolina, but his health broke down before the end of the year and he returned to Wilmington, North Carolina, where the family then lived. In 1875 he entered Princeton, where his father had studied before him. He was a good student, but also showed much interest in writing for the college papers, in debating and in athletics. Before his graduation one of his articles on government was published in The International Review.

Theodore Roosevelt was a frail child who was not strong enough to attend school, but was taught at home by tutors.

After serving three terms in the New York Assembly he lived two years on a ranch in Dakota Territory and enjoyed the experience.

In 1898 he was made lieutenant-colonel of the First Volunteer Cavalry enlisted for the Spanish-American War, and led the regiment in Cuba.

After retiring from the presidency he lived at his home, Sagamore Hill, at Oyster Bay, Long Island. He is buried in the local cemetery.

First picture by courtesy of Roosevelt House, others from Underwood & Underwood.

After his graduation in 1879 he studied law at the University of Virginia and completed the course in spite of another physical breakdown. Then in 1882 he opened a law office in Atlanta, but found that he was more interested in the study of government than in the practice of law. So in 1883 he entered Johns Hopkins University in Baltimore, from which he was to receive the degree of Doctor of Philosophy. In 1885 he married Miss Ellen Axson and began to teach at Bryn Mawr. Then he was at Wesleyan University in Connecticut for two years and was called to Princeton in 1890.

There he taught government, wrote books and magazine articles, lectured and had much influence in all university affairs. In 1902 he became president of the university. He advocated many reforms, and some serious differences of opinion arose with trustees and faculty. Before they were settled he was nominated for governor of New Jersey, in 1910, and triumphantly elected.

During the next two years he was frequently mentioned for the Democratic nomination for president, but many party workers felt that he was too independent and did their best to defeat him. However, he had strong friends, and many delegates favored him when the convention met, though not the two-thirds necessary to nominate according to the Democratic rule. However, on the forty-sixth ballot he was nominated.

This was the year 1912, in which the Republican party was divided between the followers of President Taft and ex-President Roosevelt. As a result of the division Governor Wilson received 435 electoral votes to 88 for Roosevelt and 8 for Taft, though he received only about 42 per cent of the popular vote. He was re-elected in 1916 over Charles E. Hughes, of New York, a justice of the United States Supreme Court.

The eight years of Mr. Wilson's administrations were packed full of important events. In the first years the Federal Reserve Bank was set up and also the Farm Loan Act, intended to secure money for the farmers on easy terms; the tariff was reduced and an income tax was imposed. War with Mexico was prevented with difficulty. However, interest in home affairs was almost swallowed up by the importance of the World War, which broke out in 1914.

President Wilson was a man of peace, but the United States entered the war, April 6, 1917, and soon the streets were full of uniforms. The Selective Service Act made every fit man liable to military duty. American ships sailed at once for Europe, and the movement of troops was soon begun. The question of conserving food was placed under Mr. Herbert Hoover, who had won golden opinions by his service in relieving distress in Belgium. Dozens of other acts were passed to help win the war.

When the war ended President Wilson himself attended the Peace Conference in Paris. Many differences of opinion arose in the conference, but President Wilson considered the creation of the League of Nations the most important thing and was willing to sacrifice some of his other ideas of a proper peace to obtain it. The League became a part of the Treaty of Versailles, but when he returned home he found much opposition to both, and the Senate hesitated to ratify. While on a trip to the West to explain the League to the people and to arouse sentiment in its favor, his frail body collapsed. From this time, September 25, 1919, until his death he was a broken man. During the remaining months of the term he was able to give attention only to the most important questions.

After the inauguration of President Harding Mr. Wilson took up his residence in Washington and lived quietly until his death. The first Mrs. Wilson had died in 1914 just as the World War began. In December, 1915, he and Mrs. Edith Bolling Galt were married. Mrs. Wilson accompanied the president in his triumphs, and devoted herself to the care of the invalid until his death.

Historians say that we cannot really decide upon a man's greatness until he has been dead at least twenty-five years, and not always so early as that. Woodrow Wilson has been the subject of much discussion. He had many bitter enemies and many ardent admirers. The presidency is a difficult task, and a vigorous man will make enemies. Washington, Jackson, Lincoln, Cleveland and Roosevelt all were abused, but with Washington and Lincoln the enemies are forgotten. It is too soon to know all the historian of the future will say of the three men we have described.

THE NEXT STORY OF THE UNITED STATES IS ON PAGE 7235.

Henry Ford.

Lord Kelvin.

Sir Charles Siemens.

Joseph Jacquard.

Edmund Cartwright.

Elias Howe.

Samuel Crompton.

Eli Whitney.

Henry Greathead.

James Brindley.

SOME OTHER FAMOUS INVENTORS

CONTINUED FROM 7058

ALL our lives we have been surrounded by wonderful inventions which we do not notice because they are so familiar. We seldom stop to think what our life would be without them. Yet if we should by any chance give them a moment's thought, we should probably say that we could not live without some of the things which we take for granted.

In the story of the progress of the world from barbarism to civilization high place must be given to the inventor. Without him we should be living very narrow and very uncomfortable lives, and the world would be able to support only a small part of the population which now occupies it. Both food and clothing would be scanty, and the people who did manage to exist would have few of the comforts and luxuries of our life to-day.

We sometimes hear it said that labor only produces wealth. This is not true, for labor, unless it is wisely directed, produces little. An invention which enables the same number of men to produce more, either makes the product cheaper or else fewer men can make enough for all, and some of the men can do or make something else.

The inventor sometimes makes it possible to use the resources of the world which without his invention would be worthless, or else go to waste. Of what use would a mountain of iron be to anyone if we did not know how to smelt it? The power in boiling water has always existed, but it did no valuable work until the steam engine was invented.

Much of the work of the inventor has been to make machines do the work of the muscles of men or of animals. He makes fingers of brass or steel which do the work of fingers of bone and flesh, do it faster and do not tire. Human fingers can separate cotton from the seeds, but one cotton gin can do as much as thousands of human fingers. A woman can sew a seam, but a sewing machine can do the work of many women. A reaper can cut as much wheat as many men. A tractor can do the work of many horses.

We have meant to give full credit to the inventor in our book. We tell of the men who gave us light on page 989. We see how railways came to be on page 1611. The story of the men who helped to discover and harness electricity is told on page 1243. We tell the story of the men who made telegraphs, telephones and wireless on page 6235. We have also told of bridge-builders, aviators, scientists, physicians, printers, shipbuilders, lock-

smiths and many other benefactors of humanity. In fact, the Book of Familiar Things and the Book of Men and Women are full of the stories of great inventors who have helped to make the world a more comfortable place to live in.

We have not attempted to tell of all the inventors, however. The whole Book of Knowledge would not be large enough for the full story, but we did set out to tell of the most important. Now near the end of our book we find that we have neglected some who must not be omitted. In this story, therefore, we are going to tell you a little of the lives and the work of a dozen or more men. Some lived in Europe, some in America; some were trained engineers; some were educated men, while others were poor working men. They invented many different sorts of things, and there is little connection to be found in the story except that the men are all important figures in the story of the world.

One of the first men behind the textile industry of England was a Lancashire genius who could neither read nor write—James Hargreaves. Born at or near Blackburn in 1745, he entered a mill owned by Sir Robert Peel's grandfather, where as a shrewd and able man, he was set to work to improve a machine for carding cotton in order to abolish the old system of clearing and straightening the fibres by hand.

But he worked at home, too. The cotton trade at that time depended largely on work done in cottages and little farms. Part of the cotton had to be spun into thread to make the warp, and part into the weft (or woof) which crosses the texture. It happened that one day Hargreaves knocked over the simple little machine his wife was using for spinning weft, and to that action we may trace the work he did for himself, for his country and for the world at large.

The machine was fitted with a wheel and spindle which spun only one thread at a time. When dislodged, the wheel and the spindle, thrown from a horizontal into a vertical position, continued to revolve, tangling the thread.

Hargreaves saw that by widening the wheel and employing several upright spindles he might spin a number of threads at the same time, instead of one, as heretofore. He did so in secret, never dreaming that he was to found a new industry, but simply that he might have more material with which to work, and so earn more money to provide food and clothing for his family.

He made his first machine, the original spinning-jenny, and stealthily began to manufacture yarn in such quantities as no weaver had ever thought of producing. The result was that the Hargreaves household was soon making eight times as much material, and so helping the prosperity of everybody concerned in the mill, for yarn was the one thing they all needed.

But the narrow jealousy of the people of the neighborhood was aroused at the suggestion, whispered abroad, that Jim Hargreaves was using machinery. Machinery—why, it would rob honest handworkers of their living; it would drive all folk away from Blackburn and the surrounding towns. The tidings ran like fire, and the weavers of Darwen, Mellor, Tockholes and Oswaldtwistle assembled at Blackburn, and with the local men marched, an army of execution, to the poor cottage where Hargreaves lived.

They forced a way into the house, they smashed the machine, they demolished the furniture, and then they marched down to Peel's mill, where Hargreaves was at work, and wrecked that.

Hargreaves went to Nottingham and joined hands with a man named Thomas James, who had a little capital and a great faith. Together they began the manufacture of the spinning-jennies, but, having hounded him out of home and occupation, Lancashire was now using his jennies wholesale without paying him a farthing royalty.

THE POOR REWARD OF A MAN WHO MADE FORTUNES FOR OTHERS

The desperate inventor began an action to recover damages, but when his lawyer found how many dishonest cotton-manufacturers in Blackburn alone had stolen the device, he threw up his brief in dismay, saying he could not fight an army. Hargreaves did not die in poverty, but we know that wealth did not come to this man who had placed at the disposal of his native county a device for building up unparalleled prosperity.

Sir Richard Arkwright's story comes into this same time with a greater hardship still, for here was a man with much more to offer, who had to triumph over still more extended injury. Born at Preston, Lancashire, in 1732, the youngest of

thirteen poor, ill-educated children, he did not master spelling and grammar till he was rich and over fifty. He suffered great poverty in his youth, working as a penny barber, then as a traveling wigmaker; yet he found time to think out a better machine than that of Hargreaves.

He devised a spinning-frame which provided a stouter material strong enough to be used as warp. But he could not make it, and no one would help him, poor, ragged and unkempt genius that he was. The instrument-maker to whom he applied for help would have nothing to do with him personally, but somehow was persuaded to lend him the services of a man named Kay to make the clockwork part of the apparatus.

As soon as Arkwright reported his invention the manufacturers cried out against machinery, and drove him to stocking-making and calico-manufacture. Then they turned against him an old Act of Parliament which decreed that no such fabric should be exported save under heavy tax, nor made at home at all unless it included a linen warp.

Still the gifted starveling struggled on, and patented an astonishing machine, which embraced the

Young Nasmyth sketches George Stephenson's Rocket.

The work of a worm inspires Brunel with the idea of tunneling under the Thames.

entire manufacture of cotton, carding, drawing, roving, spinning, and put the staple trade of Lancashire ahead of all competitors, where it has ever since remained. His reward was to see his patent infringed everywhere by rascally rivals, who denounced his machinery, used it themselves, and refused to pay royalty.

The Triumph of Arkwright

Nevertheless, he set up his own factory at Chorley, near Preston, and saw it wrecked by mobs. But fanatics among the workers, with robbers and pirates among rival manufacturers, could not defeat his iron resolve. He persevered in spite of all injustice and cruelty, made a fortune, educated himself, was knighted, created the factory system, enormously enriched England, and died, in 1792, both rich and honored.

Even to-day it is difficult to write without indignation of these pioneers, and especially when we come to Samuel Crompton, one of the most lovable of them all. Born near Bolton, Lancashire, in 1753, he received as good an education as the local day school afforded, but the family was desperately poor. There was musical genius in Samuel, but no money for furnishing

him with instruments. He made himself a fiddle and learned to play so well that he was able to earn eighteenpence a night by working in a Bolton orchestra.

He accounted himself passing rich on that sum, and bought books and materials for the making of his famous spinning-mule. This was a contrivance of great ingenuity which gave a better yarn than either Arkwright or Hargreaves could produce. He worked at cotton-spinning by day with the rest of the family, and played his fiddle at the theatre in the evening. Then, when all the rest had gone to bed, he sat working far into the night, year after year, on his mule.

The machine-smashing frenzy was running through the land, and poor Samuel used to take his machine to pieces and hide it, part by part, in a little secret chamber which he had made in the roof by cutting a hole through a ceiling.

It was perfected at last, and he turned out wonderful yarn with it, secretly made, of course, so that workmen should not rush in and smash his machine. The fame of his yarn soon spread, and from far and near men were sent to spy on him. He saw that he was in danger, that he could not preserve his secret, yet he was too poor to obtain a patent. "I was reduced to the cruel necessity of either destroying my machine," he said, "or of giving it to the public. To destroy it I could not think of; to give up that for which I had labored so long was almost unbearable."

A Bolton manufacturer persuaded him that if he would make his secret public eighty manufacturers in the town would each give him a guinea. All took the invention; sixty paid. Everybody pounced on it and made fortunes from its use. It extended all over Lancashire and right through the cotton-manufacturing districts of Scotland. No one outside Bolton gave a penny to the creator of the splendid labor-saving device.

At last he appealed to the Government, showing that, whereas there were in use 156,000 spindles on the Hargreaves jenny, and 311,000 on the Arkwright machine, there were over four million in use on the Crompton mule. The man who had made huge fortunes for the cotton industry was at last awarded $20,000, not by the men who had profited from his invention, but by the British Government. At last, in his poverty-stricken old age, the manufacturers of Bolton subscribed a sum which brought him in a beggarly $315 a year.

THE CLEVER COUNTRY PARSON WHO GAVE US THE POWER LOOM

Then there was Edmund Cartwright, the parson who first applied steam to textile manufacture and gave us the power loom. Born in 1743 at Marnham, Nottinghamshire, he was a man of rare gifts, a classical scholar, a poet, and instinct with inventive faculty. Hearing of the success of Arkwright's spinning machine, the good parson said, "Why not a machine to weave?" And when they answered him that such a thing was impossible, he cudgeled his brains till he had made the "impossible" apparatus.

It was a very rough, great thing, which took the strength of two men to handle, and was not a triumph; so the good parson, who really knew nothing of the practical side of weaving, went forth to see how men actually did weave. He returned and built a second machine which could do the work better, faster and more surely than men. Not only so, but he had the audacity to build a little steam engine to drive his machine, and to his great content at once received an order from a Manchester firm for four hundred machines.

The machine-wreckers were still abroad, and the factory for which the machines were furnished was burned to the ground, so the indomitable cleric invented a wool-combing machine which substituted mechanical action for men's labor and gave greatly improved results. Thereupon Parliament was petitioned to stop the use of this machine.

THE MAN WHO LOST A FORTUNE ON THINGS WHICH MADE MEN RICH

From one cause and another the wonderful parson lost $150,000 on these inventions which were to make his country richer, and in the end Parliament could not but grant him $50,000 reward for his labors and losses. He died in 1823, happy, busy to the last with inventions and poetry—a singular blend of romance and practical realism. We forget his poetry to-day, but remember the far-reaching results which have flowed from those first power looms of his.

The pattern-making loom for lace is known as the Jacquard loom, and has a moving story behind it. Joseph Marie Jacquard was born in 1752 at Lyons, one

of a family of lacemakers whose work was so hard, laborious and ill-paid that he himself would not follow it, as he said, till the toil should be less wretched and the payment better. So he became bookbinder, type-founder, hat-maker—anything but a member of the family calling.

When Jacquard was fifty the English Society of Arts offered a prize for a lace machine, and Jacquard, musing over the old problem, made a model for his own interest and put it aside as a toy. But a workman with expert knowledge secretly took the model to the Mayor of Lyons. The mayor reported it to Napoleon, who was so delighted with the ingenuity of the scheme that he appointed the astonished inventor to the Conservatoire, there to complete his machine and to take charge of all the weaving.

How Jacquard responded to the call of his country

Jacquard finished his machine and exhibited it at Lyons, where the mob carried it to the market place and smashed it to fragments. Curiously enough, the invention passed to England, where machine-smashing was equally rife, and gave the English a lace trade which has never died. Then, in self-defense, as it were, the French had to take up the machine, and begged Jacquard to resume control of his wonderful invention.

With that simple humility which marks all fine men he did so, and was content to see a great trade spring from his machines, and refused princely offers to go elsewhere and give to international rivals the benefit of his skill. He died in 1834, happy in the knowledge that lacemakers would never again toil miserably for wages so inadequate as had been the case with his own family in the craft.

The invention which prolonged the curse of slavery

So far we see inventions evolving for the rapid consumption of raw cotton, and the result was that demand for the raw material was outrunning supply. The need brings the man, and this man appeared in the person of Eli Whitney, born at Westborough, Massachusetts, in 1765. Whitney invented the cotton gin, which proved so important to the whole cotton-growing industry. How important it was will be realized by reading our article on page 5167.

Rascally cotton-growers broke into Whitney's little workshop, stole his plans, made machines of their own, and gave him nothing. He set up in business, therefore, as a maker of firearms, and produced the first of rapid-firing machine guns and secured heavy Government contracts. He introduced the system of standardization, or changeability, of parts, since carried to perfection by Henry Ford. He died a wealthy man.

The apprentice who proved himself a better man than his master

There are two great names closely linked with invention of means to advance transportation. These names are James Brindley, founder of the English canal system, and Sir Marc Isambard Brunel, who taught engineers how to make tunnels.

Brindley was a very rare genius, born at Thornsett, Derbyshire, in 1716, the son of an incompetent, negligent father who mismanaged a tiny farm of his own and let the brains of his children lie fallow. Jim had no more than a smattering of the three R's, never could more than sign his name and roughly scrawl down the figures of a simple sum. Toil in the fields till he was seventeen left the lad longing for a trade in which he could make things. He apprenticed himself to a millwright, who, first thinking him a worthless dullard, lived to learn that the rough, unkempt lad was a better man than himself.

Jim Brindley could do anything. He could mend a broken machine, invent a new one, pump a mine by methods crazily original but marvelously effective. Whenever anything went wrong with a mine or a machine they called on Jim. This boy never failed them. At last the Duke of Bridgewater was seized with his ideas for canals, so he, too, called on Brindley, whose first task under the new control was to link Manchester and Worsley by means of a canal, the first serious venture of the kind in England.

How James Brindley carried barges and canals through the air

The work meant that this unschooled genius must tunnel here, raise great embankments there, and carry his canal across the river Irwell by means of a six-hundred-foot aqueduct. Professional critics laughed at the suggestion that barges and the water that bore them should thus be carried through the air; but in July, 1761, barges were actually crossing the river by canal and passing on their way from the tunneled water at one end of

Manchester to the tunneled water at Worsley.

THE GREAT REWARD WHICH BROUGHT BRUNEL TO DISASTER

Sir Marc Isambard Brunel, born near Gisors, Normandy, in 1769, served six years in the French navy, where he invented an admirable quadrant. The French Revolution drove him to America, where he did notable work as chief engineer to New York.

He went to England with a new method of cutting blocks for ships' rigging. The British Admiralty accepted his invention, paid him $85,000 for it, and made a saving of $120,000 a year for a generation by its aid. But it brought Brunel to disaster, for the sawmills which he erected in connection with this and other works were burned down and thus ruined him. He was working at the time on what must have been one of the first ideas for a steamship. The British Government, having encouraged him up to a certain point, revoked his authority, and left him to bear the expenses, so that in the midst of inventions of possible sewing machines, boot-making machines, new type-making processes, bridge-building, and what not, he was seized and imprisoned for debt.

One of the finest spirits of the age was flung into prison for $25,000, till the Government, shamed into action, paid the sum and released him. He went from the jail to the building of the first Thames Tunnel, a grand conception in which he introduced an indispensable new invention, product of a rare piece of observation.

There is a marine worm which tunnels timber and other substances, and to effect its purpose builds, as it penetrates, a limy cell of its own secretion so that the hollowed material cannot collapse on it. Brunel adapted the plan to human art. As he tunneled the soft earth beneath the river he copied the worm by building up the walls and roof with masonry.

It was an epoch-making plan, for all tunneling inventions in yielding soil have been modeled on it ever since. In spite of this essential contrivance the work was overwhelmingly difficult. Again and again the river broke into the workings, drowned men, crushed the machinery, wrecked the undertaking.

Brunel was blessed with a splendid son, Isambard Kingdom Brunel (1806–59), who toiled like a giant in the tunnel, sometimes working there day and night for ninety hours at a time. In spite of the efforts of father and son the scheme was suspended, owing to lack of sufficient funds, for seven years.

THE WONDERFUL TUNNEL THAT ISAMBARD BRUNEL MADE

There the work stood crumbling into waste, waiting for a little money. Finally the public was goaded into action. A subscription was raised and the tunnel was completed, eighteen years after its beginning. The work did not in the end serve the purpose for which it was intended, but was used as a railway tunnel. However, it was Brunel's greatest achievement and his monument, a pattern for the world to copy, and its author had the joy of seeing it perfect before he died in 1849.

Steamships came from other brains, but no ocean giants could yet arise, simply because there was no machinery large enough to forge the huge propeller-shafts necessary to drive such ships. The hour called for new men and new methods, and James Nasmyth appeared. He was a native of Edinburgh, where he was born in 1808, son of the artist Alexander. James had his father's artistic faculty, but allied to a pronounced gift of mechanics. At eighteen he made a little steam engine to grind the colors for his father, but he had that inventive vision which enabled him to design machinery in his mind and then to draw it on paper.

He served an apprenticeship under a grand old early tool-maker, Henry Maudslay, and then, risking every cent he had, $300, he set up for himself at Manchester to build engines, machines, implements for other men's use.

THE WONDERFUL HAMMER WHICH A MAN INVENTED IN HALF AN HOUR

Nasmyth designed the hammer which bears his name. It is an invention which raises a great hammer-head high and clear of the object to be beaten and lets it fall through space from such a distance as to make the blow like a force in nature. It can be regulated with such nicety as to crack an egg or a watch glass, or to beat with titanic force the biggest forging man can make. With that available, engineering was armed with entirely new powers, and before Nasmyth died in 1890 the whole character of the industry had been changed by his device.

A means of making high-grade steel cheaply was invented by an Englishman.

Of Huguenot descent, Sir Henry Bessemer was a native of Hertfordshire, where he was born in 1813. From his youth up he poured out inventions, the first of which saved his country $500,000 a year. It was a machine for perforating and dating the stamps embossed on legal documents. Up to that time the stamps had been fraudulently used again and again.

He was promised a profitable position under the Government as a reward, but the promise was broken and he had to toil on at other things to earn a livelihood.

Bessemer made a fortune from a secret preparation of bronze powder and gold paint, for which printers and painters had paid $27.50 per pound. He gave them their material at a sixteenth of that cost, in unlimited quantities. Armed with funds, he began his researches on steel, and profiting by accidental discovery, he evolved a furnace, through which steam or a blast of air was forced, to cleanse molten pig iron of impurities and convert it into high-grade steel. The plan was given out at first in an imperfect formula, and failed.

In its perfect form the Bessemer process was scoffed at by the trade. Henry Bessemer therefore built mills of his own, and very soon was supplying the world with admirable steel $100 a ton cheaper than any other that could be made. That won the day, and rivals flocked to him from all parts to make his product by license. He gained a fortune, but his generation profited still more, for it had abundant and excellent metal for bridges, railways and buildings such as had never before been even dreamed of.

THE THREE BROTHERS AND WHAT THEY DID FOR THE WORLD

Next came Sir William Siemens, ten years the junior of Bessemer, and a native of Hanover. One of three inventive brothers, he was distinguished, with them, in electroplating, and, not least, in the steel industry. By long and laborious experiment he perfected a furnace in which the open-hearth principle was ingeniously exploited for the common good.

Gas was generated from coal consumed in closed chambers, and the gas formed the fuel for the steel process. The idea was novel and admirable, and at length proved an even greater boon than the Bessemer process. Systematically following up the subject, Siemens applied the principle of the recovery of waste heat to the superheating of steam and so enormously improved the whole scheme of steam-raising. He died wealthy and honored in 1883.

THE DISASTER WHICH INFLUENCED THE INVENTION OF THE LIFEBOAT

So far all the inventions we have looked at have been for commerce; but the next one was designed to profit the heart and not the pocket—the invention of the lifeboat. Till a century ago seacoasts were graveyards to all whose ships went down amid storms. People on shore would watch ships destroyed and men, women and children drowned during tempests, when not a boat could leave the shore.

Pity for poor seafarers stirred a London coach-builder named Lionel Lukin to make an attempt at a lifeboat in 1785. His idea was good, for the boat had air-tight compartments, but the craft was so frail that it could not sail the seas whose violence alone called it into action. A worthy old North Country beadle, William Wouldhave, contributed his quota to the fund of invention. But the hero of the achievement was Henry Greathead.

A native of Richmond, Yorkshire, where he was born in 1757, he became a boat-builder by trade and tested boats and ships in many a tempestuous tide. In 1789 there was a particularly terrible wreck, with total loss of life of crew and passengers, at the mouth of the river Tyne, and so great was the sensation created that South Shields offered a premium for a lifeboat.

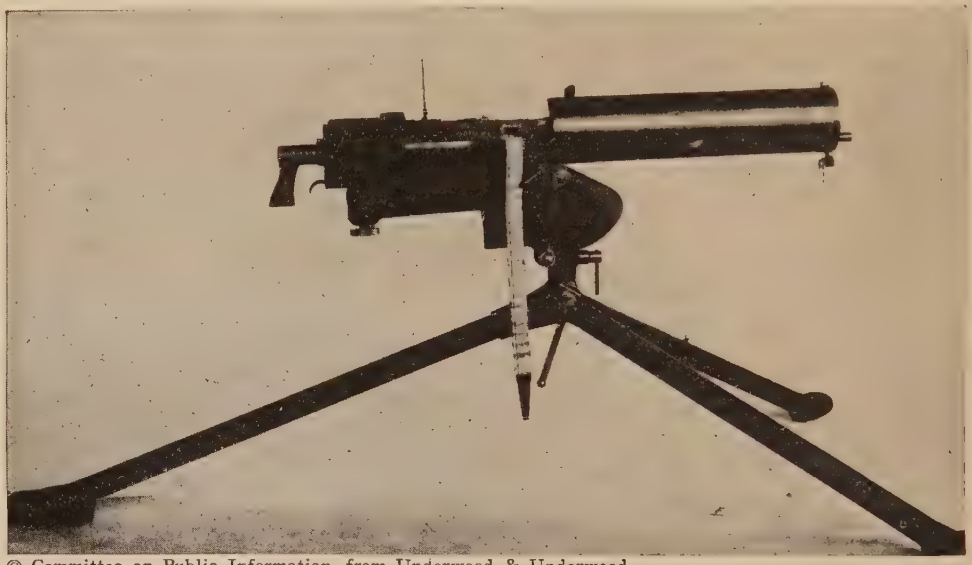
Greathead, to his lasting glory, gained the premium, as his own experiences of angry seas qualified him to do. His vessel was but a primitive version of the lifeboats we know now, but it could go out to sea in storms and rescue the perishing. It was the first to do so. It marked the first step in that march of progress which has made the lifeboat one of the finest things in the world.

Greathead was honored and rewarded in his lifetime; he is the patron saint of every station in the world from which a lifeboat is launched.

William Thomson, known later as Lord Kelvin, the brilliant scholar of Glasgow and Cambridge universities, the most famous professor of natural philosophy of his age, and one of the greatest physicists of all time, was also an inventor. He lived from 1824 to 1907.

The first Atlantic cables were useless because far too great a current was sent through them, a current which destroyed the cables meant to carry them. Kelvin saw that the plan must be weak current and intense power of magnifying the faint signals received.

To this end he invented his mirror galvanometer, a dainty marvel weighing a few grains. For the advantage of mariners he made a new compass and a deep-sea sounding machine for use in any waters by ships traveling at any speeds. These are outstanding revolutions in science known to all the world, but other strokes of his commanding genius are too many and too technical for discussion in these pages.



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In a test this heavy Browning machine gun, weighing only 34 pounds, fired 39,000 shots without stopping. The end of the barrel shows at the right, and the cylinder around it is filled with water to prevent the barrel from becoming red hot. The cartridges are in belts of 250, and one belt can be fastened to another.

It is perhaps strange to add the name of Henry Ford to a roll which bears that of Kelvin, yet this American manufacturer is, in his way, as considerable a wonder as Kelvin in his. He was born in 1864, as poor as Edison; he toiled on a little farm, hoeing and cultivating and pondering deeply. "I hoed ten thousand miles," he says, and he hated the monotony and toil.

His own experiences made him yearn to bring into existence machinery which would relieve human beings of this dreary labor. His escape was gained by way of one of the Edison factories, where he became a good mechanic, dreaming of a cheap motor tractor for the farm.

When he had saved up a little money and determined to start in business for himself, he realized that, farmers being conservative and opposed to new ideas, he must first make them familiar with cars which they could drive before they would regard with favor a motor implement for the land.

THE GREAT IDEA OF WHITNEY WHICH HENRY FORD CARRIED OUT

So began the building of Ford motor cars—cheap, ugly, but efficient. He had an enormous untapped market in America, and half the world beyond. To supply it he saw that he must standardize his productions, do everything by machinery. He brought to perfection the task of departmentalizing industry, which Whitney had long previously begun.

Various partners were taken to help the almost friendless man, but they had different ideas from his. They wanted a new model every year; he aimed at one for all time, so that his machines could go on day and night turning out the same thing in a continuous stream. He was right, they were wrong. They left: he went on and became the greatest manufacturer history has known.

In order to secure efficiency from his workpeople he cut down their hours from

HOW THE TRACTOR REPLACES THE HORSE

More and more upon the larger farms we see machines doing the work of horses. Tractors are really small engines which can be made to draw plows, reapers or other agricultural implements. The tractor generally uses gasoline or kerosene as fuel and has the power of many horses. Some of them can be guided and turned quite as easily as a team, but they work best on level ground. There are many types.

The tractor can also be used to furnish power while it is stationary. Here we see a tractor on a farm furnishing power to run a threshing machine in the field. The greatest number of inventions in the field of agricultural machinery have been made by citizens of the United States, as in the past farming has been carried on in this country on a more extensive scale than elsewhere.

Pictures, courtesy International Harvester Company of America.

twelve to eight per day, and gave them all $5 a day as a minimum. That was in itself an industrial revolution, and benefits in unending succession followed.

THE WONDERFUL ORGANIZATION BUILT UP BY HENRY FORD

The work grew to such an extent that he ceased to be merely a manufacturer. He uses, for example, half a million tons of iron a year, and as he could not get regular supplies, owing to strikes, he bought his own iron-mines. He bought his own coal-mines, he bought a railway for the carriage of supplies and finished cars, he bought forests, he bought rubber plantations for his tires, cotton plantations for the fabric of the top; he has bought stretches of riverway which give him immense horse-power in flowing water for driving machinery.

To-day he is by far the richest man in the world, and has a plant valued at hundreds of millions of dollars. He is a simple, honest, kindly man; a model employer, a model tradesman: fair to his workpeople, fair to his customers, always striving to raise his men's wages, while at the same time lowering the price of his cars to the public. He is efficiency incarnate, the one man who has solved supremely the problem of making industry one vast machine, and that machine human.

IMPROVEMENTS IN FIREARMS AND OTHER WEAPONS

American rifles, shot guns and revolvers are among the best in the world, but no one man is responsible. As early as 1811 a man named G. H. Hall made a gun which could be loaded at the breech, as the end of the barrel next to the wood is called. Some of them were made for the United States army in 1818. Many men had tried to do something like this before, but had not been successful. Now soldiers are armed with breech-loading guns.

In 1830 Samuel Colt invented a new form of pistol which could be fired several times. In 1835 he improved this by making the part containing the cartridges revolve, and so the weapon was called a revolver. This pistol could be fired many times while the old-fashioned pistol was being loaded once. Mr. Colt began to manufacture them at Hartford, Connecticut, and his factory grew to be one of the largest of its kind in the world. In this case a large fortune was gained by the inventor himself.

We hear much of machine guns these days. They are guns which can be fired two or three hundred times a minute. Many men had worked on the idea, but Dr. Richard Gatling was the first person to succeed. He completed his gun in 1861, and some of them were used during the Civil War. This gun had ten barrels. Many improvements have been made since, and now some machine guns are not much heavier than rifles.

The gun now used in the United States army is the Browning, named for its inventor, John M. Browning. The barrel of the heavy gun, a picture of which is shown, is surrounded by a water jacket to prevent it from getting red hot. The cartridges are placed in belts, each containing 250, and one belt can be fastened to another. In a test 39,000 shots were fired without stopping. There is a lighter Browning gun which can be carried by one man. The latter is really a kind of repeating rifle.

HOW GRAIN WAS CUT IN THE EARLY PART OF THE CENTURY

In the early days in North America, grain was cut with a sickle, a picture of which you may have seen. It was in shape much like a question mark. A man seized a handful of the grain in one hand and cut it off with the sickle. Next a "cradle" was used. This was a long curved knife at the end of a handle, with wooden fingers which kept the grain from falling. Some of them are still used on small farms or upon rough ground.

The first attempts to build a machine to cut grain were made in Great Britain. Henry Ogle, a schoolmaster of Rennington, made a mechanical reaper in 1822, and Patrick Bell, a young Scottish student, invented a more advanced type four years later. But Bell's model did not become popular.

Obed Hussey and Cyrus Hall McCormick, two Americans, were working on a new machine to cut grain at the same time, and both received patents: one in 1833 and the other in 1834. The more successful was the McCormick machine. This machine, which was drawn by horses, cut more than many men could do by hand. At once others began to try to improve this machine, and just before the American Civil War, John E. Heath invented a machine which not only cut the grain, but tied it into bundles, thus saving much more labor.

In 1875 John F. Appleby, who had invented a successful twine-knotter some years before, made a binder which has proved to be the basis for the modern machine. Now to some reaping machines is added a threshing machine which separates the grain from the chaff as it is drawn along.

Other improvements in farming machinery

There have been many other improvements in agricultural machinery. You may have heard from travelers of the plow used in the Philippines which is hardly more than a crooked stick. Only a little more than a hundred years ago such plows were common on this continent, though the point was covered with iron. Thomas Jefferson invented an improved form of plow. In 1797 Charles Newbold, of New Jersey, invented an iron plow, but the farmers would not use it, as they feared that the iron would poison the soil. Besides, it was very heavy and expensive.

Jethro Wood, of Scipio, New York, in 1819 invented an iron plow made in several parts, so that if one broke, it could be replaced without trouble; and this came into common use. Then the plow was put on wheels. Now, instead of holding the handles, the farmer has a comfortable seat and drives the horses. On the great farms in the West many plows are pulled along at the same time by one engine, called a tractor. One or two men with a tractor can do the work of many men and teams.

These tractors are used for many purposes. They draw agricultural machinery; they pull heavy wagons along the roads and through the fields; they pull up stumps. They also furnish power to run threshing machines, corn-shellers and the like, and to do many other kinds of work around the farms.

Only a few years ago all hay was raked by hand. Now a horse-rake does as much as twenty or thirty persons could do, and when the hay is partly dry, a tedder scatters it so that the sun can reach every blade. We have also machines which sow the seed and then cover it up. There are machines to gather corn, to husk it and to separate it from the cob. If corn had to be separated from the cob by hand, it is said that it would take all the people in the United States one hundred days a year to do this work.

Some interesting figures about farming

Someone has calculated that now it takes on the average only ten minutes of labor to grow a bushel of wheat, while seventy-five years ago it took three hours. It takes forty-one minutes of labor to grow a bushel of corn, while then it took four and a half hours. A hundred years ago about three-fourths of the people lived on farms. Now something less than one-third are able to raise food enough for the whole population and have some to spare for other nations. The chief cause of this is the invention of farm machinery.

Land can be plowed in less time; seed is sown by a drill instead of by hand; there is less hand work in cultivation, and reaping takes less time also. Now wheat is threshed by machinery, instead of being beaten out by flails. Fewer people raise more grain than was raised seventy-five years ago.

The man who found out about rubber

Charles Goodyear, who was born in New Haven, Connecticut, in 1800, was a hardware merchant, but was not successful. He became interested in rubber and made many experiments. It is said that in 1838 or 1839 accidentally he dropped some rubber and sulphur on his kitchen stove and found that he had by chance succeeded in doing what he had failed to do by experiment. This process is called vulcanization, and its discovery marks the beginning of the rubber business. The story of rubber may be found on page 1405.

Mr. Goodyear and his brother, who was also interested, next began to try to make rubber hard. They were successful in 1851, and now combs, buttons, bottles, inkwells, penholders, fountain-pen barrels and many other things are made of hard rubber. The chief difference in the processes of making hard and elastic rubber is in the amount of sulphur and the degree of heat used. Mr. Goodyear seems to have been a poor business man, and though he took out sixty patents on his inventions, he did not gain much money and died a poor man.

Sleeping cars which make long journeys possible

On this continent distances are so great that it is often necessary to spend one or more nights on the train. Once people

had to sit up in the uncomfortable seats and try to sleep in any way they could. Now one can have a good bed, and many persons sleep as well on the train as they do in their own homes. The first car arranged for sleeping was planned by a man named Woodruff in 1856, but it was not very comfortable. In 1863 George M. Pullman, a carpenter and builder, of Chicago, built a car on a new plan. It could be used as an ordinary car during the day and arranged for sleeping at night. It was much superior to anything ever known before, and now Pullman cars are used on every railroad in the country, and one can go quite comfortably from one ocean to the other. The company which he founded builds not only sleeping cars, but also parlor cars and dining cars, and furnishes attendants to go with them. The conductors and the porters are paid by the Pullman Company and not by the railroads. Mr. Pullman also invented the method of inclosing car platforms so that one can pass easily from one car to another without danger of being thrown off.

What makes high buildings in the cities possible

Everyone has seen a "skyscraper," as a very high building is sometimes called, for nowadays they are found in all large cities on this continent. Without elevators such buildings would be impossible, as no one would care to climb ten, twenty or thirty flights of stairs several times a day. There are more high buildings in America than anywhere else, and so it is natural that the elevators should be better.

The first passenger elevator in the United States was invented by Elisha G. Otis in 1853, but has been much improved since. At first elevators were very slow and not very safe, but now they move very rapidly and accidents are not common. Most elevators are run by electric power, though many are raised or lowered by water pressure. We call these hydraulic elevators. You may read more about elevators in the story beginning on page 1215.

Some improvements in stopping railway trains

When railways first began to run, trains were short, the cars were light, and speed was not great. Hand-brakes worked by a wheel and a chain were able to stop the cars, though accidents sometimes occurred. As speed grew greater, accidents grew more frequent, for the brakemen could not always stop the trains in time. As you know, the swifter the speed and the heavier the object, the more difficult it is to stop quickly.

The man who made it possible to run the heavy trains of to-day at high speed was George Westinghouse, who was born in Central Bridge, New York, in 1846. While still a boy he served in the Civil War, and then went to college. It is said that one day his train was delayed on account of a collision which had occurred because the engineers could not stop their trains, and that he began to plan some way of stopping trains more quickly. In 1868 he invented an air-brake which was carried on the engine. Air was compressed, and when released, ran through pipes under the cars and pushed the brakes against the wheels. The invention worked, but has been much improved since. The chugging you hear on an engine standing at the station is the air-brake, which stops the train or prevents it from running away when going down grade. Mr. Westinghouse made other inventions, besides, and built great works to manufacture electrical machinery.

The sewing machine, which helped the women

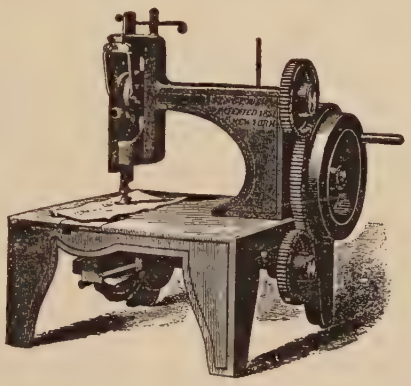
No one man invented the sewing machine, which has been of so much benefit to the world. In the days when all seams were sewed by hand, people generally could have few clothes, for there was not time to make many. Now, many garments can be made in a very short time, and can be sold at a much lower price than was possible before the invention of the sewing machine.

The first attempt at mechanical sewing was made in 1775, when Charles F. Weisenthal patented in England a machine having a needle with two points and an eye in the middle. The next sewing machine was made by Thomas Saint, a cabinetmaker of London in 1790. Some of the features of this invention have since been preserved in every successful machine.

In 1818 the Reverend John Dodge, an American, invented a machine which made a stitch like a "backstitch," but this was never patented. The first patent for a sewing machine issued in the United States was that to a man named Lye in the year 1826, but very little is known of this invention. Four years later Barthlemy Thimonier, a French tailor,

made a machine which was very much like that of Thomas Saint. This was patented in France and in the United States, but it was not practical enough to be of permanent value. Poor Thimonier suffered as many inventors had done before him, for a furious crowd wrecked his shop and destroyed his machines.

John Greenough, an American, patented a machine in the United States in 1842, but it was not of much service. The crown of actual success in mechanical sewing was won by Elias Howe, a native of Massachusetts. A young mechanic, only twenty-two years of age, hardly capable of supporting himself on his scanty earnings, he labored manfully at the self-imposed task in a little garret in his native town during the few hours that were spared to him after his ordinary labors of the day were ended. He became enthusiastic, and eventually devoted himself exclusively to the construction of his machine. The result was that in 1845 he perfected his first sewing machine, and in order to test his practical success he sewed with it all the principal seams in two suits of clothes. On September 10, 1846, he obtained his first patent.



Photo, courtesy Singer Sewing Machine Company.

The first Singer machine.

In many ways this machine is closely comparable with the machine we know to-day. Howe, like all other inventors, had at first retained the "eye" of the needle in the same position as it occupied in the ordinary needle, and, perhaps naturally, it was his wife who suggested transferring it to the point where it has ever since remained in sewing-machine needles.

A groove along the upper and under sides allowed of the thread lying therein and so passing very easily through the cloth. There is no doubt that Howe borrowed, as others did, from the work of predecessors who had failed, but there were many years of patient work and experimenting before even such a crude success was arrived at. The "feed" mechanism was a very weak point, and the rest of the machine left much to be desired. But the two great points were the eye-pointed needle and a shuttle carrying thread. Howe sent the machine over to England, selling it for a trifling sum. Later he went over himself, but met with bad luck and had to borrow money to buy a steerage back to the United States. He was successful in fighting infringements of his patents, and received about two million dollars for the use of his invention.

Other inventors added to the improvement of the sewing machine in the next few years. Allen B. Wilson, Grover, Baker, Morey and Johnson are names to be remembered. But a real working sewing machine—a machine that would do continuous stitching—was still wanting. Toward the end of September, 1850, Isaac M. Singer turned his attention to improving a machine made by Walter Hunt. He said he would invent an improved model at a cost of forty dollars. It was completed in less than twelve days and under the cost agreed upon. In 1851 Singer patented this machine, shown in our picture. It had a vertical needle movement, driven by a rotary overhanging shaft, and a roughened feed-wheel extending through a slot in the table. A yielding presser foot alongside the needle held down the work. Motion was given to the needle-arm and the shuttle by gearing. It used two threads and made the lockstitch, the loop of the needle thread being interlocked at each downward movement by the thread of a reciprocating shuttle. The Singer sewing machine proved to be an actual working machine that did continuous stitching.

Other machines, for sewing leather and similar thick substances, were invented later; and now there are dozens of different types, all good, and American machines are sold all over the world. In the great factories the machines are often run by electric power.

There are many inventions of which one never hears, that have added very much to our convenience and comfort. Once shoes were divided into two classes, those in which the sole was sewed on by hand, and

those in which it was fastened on by wooden pegs or iron nails. The first kind was very expensive, and the second kind was stiff and uncomfortable. In 1871 a man named Goodyear, who was related to the rubber man, invented a way by which the soles could be sewed by a machine. The shoes made in this way were not so good as those made entirely by hand, but they were much better than those which had the soles nailed on.

This was only the beginning of inventions used in making shoes. Dozens have been made since, nearly all of them by Americans, and now the American shoe factories are among the wonders of the world. Some of the machines are shown in the Story in a Pair of Shoes, beginning on page 6441.

VARIOUS INVENTIONS WHICH MAKE LIFE EASIER

You were shown, in the story of Bread and Butter, on page 371, the old-fashioned mills where wheat was ground between two stones. In 1875 F. Wegmann, an American of German blood, invented a way of crushing the wheat between smooth steel or porcelain rollers. In this way a larger quantity of flour was gotten from a bushel of wheat, and the flour was whiter.

HOW THE CONVENIENT TYPEWRITER WAS INVENTED

The business man of to-day would not know how to get along without the typewriter. On it letters are written quickly and legibly, and copies can be kept, so that much trouble may be avoided. Yet the typewriter is a modern invention, and men of fifty years ago knew nothing of it. They did all correspondence by hand.

Christopher L. Sholes, an editor of Milwaukee, felt the need of a machine to number tickets, coupons and blank books, and set to work to invent one. He succeeded, and then decided to make a writing machine. Several men had already tried, but their machines were clumsy and got out of order easily. With two friends Mr. Sholes secured a patent in 1868. The machine was heavy and clumsy, and corrections could not be made, but the right idea was there. One of the letters written on this machine fell into the hands of James Densmore, and he bought a share in the patent. Model after model was built, each a little better than the one before, and in 1873 the invention was bought by Remington & Sons, who owned a fine machine shop and gave the new machine their own name. Sholes sold his share for $12,000, but Densmore preferred to receive a small sum on every machine made and is said to have received a million and a half dollars before the patent expired. Many changes and improvements have been made in the Remington machine, and in many others which have been patented, but to Mr. Sholes is due the credit of the first practical typewriter.

An inventor who turned his mind to many things was Thomas Blanchard, who, while only a boy, invented a machine to pare apples. Next was a machine to count tacks, then made by hand. Soon he invented a machine to make the tacks. It is still in use, though somewhat improved. His most important invention was the copying lathe, which copies exactly the model placed in the machine. This was first used to make gunstocks and lasts for shoes. For many years Mr. Blanchard was employed in the United States Arsenal at Springfield, Massachusetts, and there the original lathe may be seen to-day. Another machine, for bending wood for shipbuilding, or for making curved handles for plows and other tools, and shaping wooden wheels, brought him more money than his more important inventions.

WHY NORTH AMERICA LEADS IN INVENTION

Wages are higher in Canada and the United States than anywhere else in the world. This has been true from very early times, and the fact has had great influence upon the growth of the country. The reasons for the high wages we cannot stop to discuss here, but they have brought many immigrants across the ocean.

In Europe wages are lower than they are in the newer countries, and therefore we find many things done by hand in all the countries of Europe which here are done by machines. In India wages are still lower, and there we find very little machinery. You can see why this is true. An employer who can use much hand labor does not need to put much money into expensive machinery and does not need to construct buildings at high cost.

Where wages are high, employers will try to get their work done with as few workmen as they can, and this is one of the reasons why North America is ahead of the world in labor-saving machinery.

THE END OF THE BOOK OF MEN AND WOMEN.

Bagdad, the city where Sindbad the Sailor lived.

SINDBAD THE SAILOR

CONTINUED FROM 7008

AS Sindbad the Sailor was sitting in the mansion which he had built in the city of Bagdad, he heard a poor porter in the street say: "Men are not rewarded according to their merit. I have worked harder than Sindbad, and yet he lives in splendor and I live in misery."

Sindbad was moved by the porter's complaint, and invited him to come in and listen to the story of his adventures.

"Perhaps when you have learned by what sufferings I won my wealth," said Sindbad, "you will be more contented with your own lot in life.

"Look at my white hair and worn face! I seem an old man. But how young and strong I was when I sailed away to make my fortune by trading in strange countries! Soon after we departed, our ship was becalmed near a small island, but when we landed to look at the place, we found that what we had taken for land was only the green back of a great whale.

"No sooner had we landed than it began to sway to and fro, and then it plunged beneath the waves and left us struggling in the sea. Clinging to a large piece of wood, I was washed ashore on a desert island.

"Here I thought I should have starved. But on wandering about I found a clump of fruit trees, and hidden among them a great white ball about fifty feet in size. By this time I was very weary, and so when I had eaten some of the fruit I crept beneath the ball and lay down to sleep. Just as I was closing my eyes I looked up, and saw that the sky was darkened by the wings of a gigantic bird.

"'Good heavens!' I exclaimed. 'This great white ball is the egg of the monstrous bird that sailors call a roc.'

"And so it was. The roc settled on the egg under which I was lying, and one of its claws, which was as big as the trunk of a tree, caught my dress.

"At daybreak the roc flew up into the air, and carried me to such a height that I could not see the earth. Then it descended with such speed that I nearly lost my senses. As it alighted I freed my dress, and found myself in a deep valley cut off from the world by a circle of high, steep mountains.

"It was the Valley of Diamonds! The ground was covered with precious stones. Full of joy, I began to fill my pockets with them, but my joy was soon turned to terror. The valley was haunted by great serpents, and I could find no means of escape.

"I crept into a cave and blocked up the opening with a large stone, but all night I was kept awake by the hissing of the serpents. At daybreak they retired, as they were afraid of the roc that used then to visit the valley in search of food. Then I stole out of the cave, only to be knocked over by

something that came tumbling down the mountainside. It was a great piece of fresh meat. As it rolled along, the diamonds on the ground stuck to it. Looking up, I saw on the mountains a band of men, who were preparing to roll another piece of meat into the valley.

" 'I have heard of this means of getting diamonds,' I said to myself. 'It strikes me that it is also a good means of getting away.'

"So I tied myself to the piece of meat, and hid beneath it, and presently an eagle swooped down and seized the meat and carried it to its nest on the top of the mountains. The band of men drove the eagle away, and turned the meat over to pick off the diamonds that had stuck to it, and found me tied to it.

"When they had all the diamonds they needed, we sailed for home. But on passing the desert island my companions landed with an ax and broke open the great white ball. A terrible scream rang through the sky. The roc had seen them. They rushed back to the ship, and we quickly sailed away; but the roc followed us, bearing in its claws a great piece of granite. This it dropped on our ship, and down we all went into the sea. Holding on to a fragment of wreckage with one hand, and swimming with the other, as the sea was calm, I managed to reach another island.

"It was a delicious spot! Sparkling streams ran between vineyards full of grapes and orchards full of fruit. There I met a strange old man, who made signs to me to carry him over one of the streams. As soon as I hoisted him on my back, the old man threw his legs over my neck and squeezed my throat so that I fainted. When I came to, he was still fixed on my shoulders. There he remained all day and all night, and when I awoke next morning there he was still. He never got off.

"He made me his slave. When, in order to keep up my strength, I made some wine out of the grapes, he took it from me and drank it all up. Happily, it was too strong for him, and releasing his hold of my neck, he fell to the ground, and I killed him.

"By the shore I met some sailors, with whom I returned to Bagdad.

" 'That was the Old Man of the Sea,' they said to me. 'You are the first person that has escaped from being at last strangled by him.'

"Now don't you think," said Sindbad to the porter, "that I have earned all the riches that I brought away from the Valley of Diamonds?"

The porter agreed that he had, and Sindbad gave him a handsome present, and he went home more contented with his own lot in life.

FOOLS AND JESTERS AND KINGS

ALMOST as old as history is the court fool, or jester, of whom we read in so many of Shakespeare's plays. The reason for these droll creatures is not generally known. They were employed to aid digestion.

When we laugh we exercise certain muscles which play an important part in the digestion of food. The more we exercise these muscles the better can we digest our dinners. People in ancient times, who ate enormously, soon discovered that a dinner at which they sat glum and silent, or at which they talked only about serious things, gave them a good deal of bother to digest. And so funny fellows were procured, who by their antics sent the eaters into shouts of laughter.

But, as the world moved on, the absurd follies of fools ceased to make men laugh, and instead of the fool came the jester. There was all the difference in the world between the court fool and the court jester. The fool was a mere knockabout clown; the jester was a polished and brilliant wit, an inimitable teller of good stories, a critic of politics, religion and manners. The jester looked down upon the clown, and despised him for an ignorant person of low degree. The jester became an influential courtier, one of the most powerful men at the king's elbow.

He could avert war, save a noble from execution, get justice for the poor, and improve manners. So long as he kept the king amused, or served his Majesty with the sauce of laughter at dinner, the jester was one of the very first men in the kingdom. The first court fool known in history was a woman. This was Iamby, who was famous at the court of the queen of Eleusis for her frolicsome humor, her funny stories, her playful gambols and her merry tales.

THE STORY OF BRAVE WILLIAM TELL

THE MAN WHO FACED A TYRANT

THERE walked one day across the market square of Altdorf, in Switzerland, as fine a looking man as one could wish to see. Tall and straight, broad and shapely, with ruddy, bearded face and proudly held head, this man of the mountains strode with clean, swinging stride across the square, with a look of bright happiness in his eyes, and a cheerful word of greeting for his friends. Many turned to say: "There goes William Tell, the crossbowman of Bürglen."

This man, who was said to be the finest crossbowman in Switzerland and the best handler of a boat on the storm-swept lake of Uri, lived quietly in a mountain cottage, with a wife who shared every thought of his heart, and children for whom it was his delight to work. He hunted deer in the mountains and went fishing on the lake. His children never lacked good food and clothing. His home was trim and neat. There was no family in that district more firmly established in peace and contentment.

Tell had sold the pack of deerskins which he had brought with him to Altdorf. He was on his way now to buy winter clothing of warm wool for his children. He had money, enough and to spare, and he was in a mood of great happiness. In an hour or more he would be singing a song on the road to his mountain home. Suddenly he felt his arm seized, and found himself in the grip of an Austrian soldier. In another instant he was surrounded. The soldier who had seized his arm pointed to a pole with a ducal cap on the top. "It is death not to bow to that cap, and you know it!" said the soldier.

A silence fell upon the whole square. People left off their trading and crowded round the group. A thing greater than trade was at stake now—a man's freedom, a nation's liberty. William Tell had flushed a deeper red. He brought his eyes from the cap on the pole to the soldier's face. "I have done nothing unlawful," he said slowly.

"You have insulted the majesty of the Duke!" said the soldier.

William Tell kept a steady eye. "Why," said he, "should a man show more reverence to an empty cap than to an empty cloak or a pair of hose?"

At this there came from behind the soldiers the figure of the Governor of the district, the tyrant Gessler. It was this Gessler who, set over the once-free Swiss by their conqueror and oppressor, the Duke of Austria, had trodden liberty under foot, had murdered and imprisoned all who stood against him, and, as a last barbarity, had declared that everyone who did not do homage to the badge of Austrian rule set up on the pole in their market place should die.

William Tell faced the Governor. He feared no man. No one could break his proud spirit. In his mountain he had brooded upon the shame of the slavery which enchained his country, and had already spoken with his friends of resistance. Never, never would he do homage to the hated badge of the tyrant's mastery.

"So you would make a jest of the sign of majesty?" asked the Governor, approaching Tell, while the soldiers saluted. At that moment there came from the crowd a child's cry of "Father! Father!" The crowd turned about, opened out, and presently William's little son, who had come without leave to the fair, was rushing to his father. The Governor caught the boy's arm. "Is this the brave traitor's son?" he asked.

"Hurt him not," said Tell. "He is my firstborn."

"Oh, I won't hurt him!" answered the terrible Gessler. "If any harm should come to him, it will not be by me, but—by you." A horrible smile lighted his eyes. "Here," said he to a soldier, "take the boy and tie him to the trunk of that linden tree over there, and place an apple on his head."

"What is this for?" demanded Tell.

"I am told that you are called the crossbowman of Bürglen," replied the Governor, "and I should like you to give me an exhibition of your skill. Your life is forfeit. But I am in a merciful mood; I will give you a chance of redeeming it. Come, listen to me. If at this distance you can shoot an arrow so as to split the apple on the curls of your firstborn, I will let you go free. If not— if you miss the apple, or kill your child—I will execute you, here and now."

"Have you no mercy?" cried Tell,

William Tell, seen here with his little son, was arrested for refusing to bow to a tyrant set over the Swiss people by their Austrian conquerors. He was offered his freedom if he would shoot an arrow at an apple placed on the head of his little boy, which he did. Arrested again, he escaped, killed the tyrant, and freed the country. They would have made him king, but he went back to his home.

trembling with indignation. "And do you think I will attempt to save my own life at the risk of my son's?"

"I am doing you a favor," replied Gessler. "Think. By a lucky shot you may save your life, and go home!"

Tell held out a hand which was trembling. "How can a man who loves his son aim with a steady hand an inch above his temples? Ah, look at the child! My lord, look at him! He is no kin of yours; you know nothing of the pretty ways by which he has climbed into a father's heart, the innocence of his eyes, the beauty of his face! Am I to risk that life?"

Gessler laughed brutally. "Well, you either shoot an arrow, or die."

"Then I will die."

"And first your child shall have his neck wrung before your eyes!"

A blinding passion of indignation overswept the noble soul of the mountaineer. "Give me the bow," he said. "One thing in mercy I ask. Let the child's face be turned away from me. Let me not see his eyes fixed upon me."

A way was cleared between father and son. A dense multitude stood on either side. The boy, with his face to the tree, bound by ropes to its trunk, felt the apple weigh like lead upon his head. A dreadful silence fell upon the market square. William Tell chose two arrows. One he thrust in his girdle; one he fitted to his bowstring. Then for a moment he stood, a little bowed of shoulder, with his eyes downward: he was praying. You might have heard a leaf fall, so still was the place. Then Tell raised his head; his eyes were steady; his hands had become still; his face was like iron. He brought the crossbow to his shoulder and laid his eye to the feather of the shaft. *Twang!*

The arrow shot forward, and, as it were at the same moment, buried itself deep in the tree. The apple fell in equal parts on either side of the boy's head. A roar of cheering went up to heaven, and Gessler turned to Tell.

"A good shot, traitor!" he said cruelly. "But tell me, for what reason did you take two arrows?"

Tell laid his hands upon the arrow in his girdle. "If the first arrow had hurt my child," he said, "this one by now would be through your heart!"

"Oh! So I run in danger of my life?" said the Governor. "But I will keep the pledge I gave you. You shall not die. I will give you your life. But the rest of that life you will spend in the dungeons of my castle, and your bowstring will not then be a danger to me."

At this Tell was seized again, and rushed by the soldiers through the scowling mob to the quay, where the Governor's ship was moored. But it chanced that as the ship crossed the lake of Uri a storm arose, savage and wild, and it seemed as if everyone would be drowned. The Austrians could not manage the vessel and began to abandon hope.

In their panic they remembered that Tell was reputed the best sailor in that part of the world, and spoke to the Governor. "Loose him," said Gessler, "and let him save us." So Tell took the helm, and under his guidance the little ship soon righted herself. But as he headed her for the shore he was thinking, not of Gessler and the Austrian soldiers, but of freedom—freedom for himself and for Switzerland. He would free himself and save his country.

He brought the ship close to a rock that jutted out from the coast, and then, as it shot past, he sprang suddenly upon the rock, and left the Austrians to save themselves. Swift of foot, he scaled the rocks, climbed the cliff and made his way across the mountains to a place on the road which Gessler, if he saved himself, would have to pass. Here he lay concealed among the bushes, with an arrow fitted to his bowstring, his heart set on delivering Switzerland from the tyrant.

As he waited darkness fell among the mountains. Presently there came to him the tramp of feet. "And if I live to return to Altdorf," Gessler was saying, "I swear I will destroy the whole brood of this traitor Tell, mother and children, all in the same hour!"

"You shall never return!" said Tell to himself. And as the soldiers went marching on, he let fly the arrow, and Gessler dropped dead in the dust.

With their leader fallen, the soldiers became confused and fled. But Tell's friends rallied around him.

Thus William Tell inspired the rising of the Swiss people, which led to the overthrow of the Austrians and made Switzerland a free country.

They would have made him king, but he shook his head and went back to his home among the mountains, which was more to him than many palaces.

THE LAST CLASS

By Alphonse Daudet

I WAS very late for school that morning, and I was terribly afraid of being scolded, especially as Monsieur Hamel had told us that he should examine us on participles, and I did not know the first thing about them. For a moment I thought of staying away from school and wandering about the fields. It was such a warm, lovely day. I could hear the blackbirds whistling on the edge of the wood, and in the Rippert field, behind the sawmill, the Prussians going through their drill. All that was much more tempting to me than the rules concerning participles; but I had the strength to resist, and I ran as fast as I could to school.

As I passed the mayor's office, I saw that there were people gathered about the little board on which notices were posted. For two years all our bad news had come from that board—battles lost, conscriptions, orders from headquarters; and I thought without stopping: "What can it be now?"

Then, as I ran across the square, Wachter the blacksmith, who stood there with his apprentice, reading the placard, called out to me: "Don't hurry so, my boy; you'll get to your school soon enough!"

I thought that he was making fun of me, and I ran into Monsieur Hamel's little yard all out of breath.

Usually, at the beginning of school, there was a great uproar which could be heard in the street, desks opening and closing, lessons repeated aloud in unison, with our ears stuffed in order to learn quicker, and the teacher's stout ruler beating on the desk: "A little more quiet!"

I counted on all this noise to reach my bench unnoticed; but as it happened, that day everything was quiet, as of a Sunday morning. Through the open window I saw my comrades already in their places, and Monsieur Hamel walking back and forth with the terrible iron ruler under his arm. I had to open the door and enter, in the midst of that perfect silence. You can imagine whether I blushed and whether I was afraid!

But no! Monsieur Hamel looked at me with no sign of anger and said very gently: "Go at once to your seat, my little Frantz; we were going to begin without you."

I stepped over the bench and sat down at once at my desk. Not until then, when I had partly recovered from my fright, did I notice that our teacher had on his handsome blue coat, his plaited ruff, and the black silk embroidered breeches, which he wore only on days of inspection or of distribution of prizes. Moreover, there was something extraordinary, something solemn about the whole class. But what surprised me most was to see at the back of the room, on the benches which were usually empty, some people from the village sitting, as silent as we were: old Hauser with his three-cornered hat, the ex-mayor, the ex-postman, and others besides. They all seemed depressed; and Hauser had brought an old spelling-book with gnawed edges, which he held wide-open on his knee, with his great spectacles askew.

While I was wondering at all this, Monsieur Hamel had mounted his platform, and in the same gentle and serious voice with which he had welcomed me, he said to us: "My children, this is the last time that I shall teach you. Orders have come from Berlin to teach nothing but German in the schools of Alsace and Lorraine. The new teacher arrives tomorrow. This is the last class in French, so I beg you to be very attentive."

Those few words overwhelmed me. Ah! the villains! that was what they had posted at the mayor's office.

My last class in French!

And I barely knew how to write! So I should never learn! I must stop short where I was! How angry I was with myself because of the time I had wasted, the lessons I had missed, running about after nests, or sliding on the Saar! My books, which only a moment before I thought so tiresome, so heavy to carry—my grammar, my sacred history—seemed to me now like old friends, from whom I should be terribly grieved to part. And it was the same about Monsieur Hamel. The thought that he was going away, that I should never see him again, made me

forget the punishments, the blows with the ruler.

Poor man! It was in honor of that last lesson that he had put on his fine Sunday clothes; and I understood now why those old fellows from the village were sitting at the end of the room. It seemed to mean that they regretted not having come oftener to the school. It was also a way of thanking our teacher for his forty years of faithful service, and of paying their respects to the fatherland which was vanishing.

I was at that point in my reflections, when I heard my name called. It was my turn to recite. What would I not have given to be able to say from beginning to end that famous rule about participles, in a loud, distinct voice, without a slip! But I got mixed up at the first words, and I stood there swaying against my bench, with a full heart, afraid to raise my head. I heard Monsieur Hamel speaking to me: "I will not scold you, my little Frantz; you must be punished enough; that is the way it goes; every day we say to ourselves: 'Pshaw! I have time enough. I will learn to-morrow.' And then you see what happens. Ah! it has been the great misfortune of our Alsace always to postpone its lessons until to-morrow. Now those people are entitled to say to us: 'What! you claim to be French, and you can neither speak nor write your language!' In all this, my poor Frantz, you are not the guiltiest one. We all have our fair share of reproaches to address to ourselves.

"Your parents have not been careful enough to see that you were educated. They preferred to send you to work in the fields or in the factories, in order to have a few more sous. And have I nothing to reproach myself for? Have I not often made you water my garden instead of studying? And when I wanted to go fishing for trout, have I ever hesitated to dismiss you?"

Then, passing from one thing to another, Monsieur Hamel began to talk to us about the French language, saying that it was the most beautiful language in the world, the most clear, the most substantial; that we must always retain it among ourselves, and not forget it, because when a people falls into servitude, "so long as it clings to its language, it is as if it held the key to its prison." Then he took the grammar and read us our lesson. I was amazed to see how readily I understood. Everything that he said seemed so easy to me, so easy. I believed, too, that I had never listened so closely, and that he, for his part, had never been so patient with his explanations. One would have said that, before going away, the poor man desired to give us all his knowledge, to force it all into our heads at a single blow.

When the lesson was at an end, we passed to writing. For that day Monsieur Hamel had prepared some entirely new examples, on which were written in a fine, round hand: "France, Alsace, France, Alsace." They were like little flags, waving all about the class, hanging from the rods of our desks. You should have seen how hard we all worked and how silent it was! Nothing could be heard save the grinding of the pens over the paper.

. . . . . .

From time to time, when I raised my eyes from my paper, I saw Monsieur Hamel sitting motionless in his chair and staring at the objects about him as if he wished to carry away in his glance the whole of his little schoolhouse. Think of it! For forty years he had been there in the same place, with his yard in front of him and his class just as it was. But the benches and desks were polished and rubbed by use; the walnuts in the yard had grown, and the hop vine which he himself had planted now festooned the windows even to the roof. What a heart-rending thing it must have been for that poor man to leave all those things, and to hear his sister walking back and forth in the room overhead, packing their trunks! For they were to go away the next day—to leave the province forever.

. . . . . .

Suddenly the church clock struck twelve, then the Angelus rang. At the same moment, the bugles of the Prussians returning from drill blared under our windows. Monsieur Hamel rose, pale as death, from his chair. Never had he seemed so tall.

"My friends," he said, "my friends, I—I—"

But something suffocated him. He could not finish the sentence.

Thereupon he turned to the blackboard, took a piece of chalk, and, bearing on with all his might, wrote in the largest letters he could: *"Vive la France!"*

CINDERELLA AND THE GLASS SLIPPER

IN the days of the fairies there was a little girl named Cinderella. She had no mother, but she lived in a great house with her father and was the happiest little girl in the world.

One day a strange lady came to the house with her two daughters, who were so finely dressed and so proud-looking that Cinderella felt very shy. But when her father told her that the strange lady was her new mother—her stepmother—and that the proud-looking young ladies were her new sisters, Cinderella was very glad, because she thought that they would be kind to her.

But the new sisters were not kind at all. They took her toys away, and gave her all the hard work to do. She had to wash the dishes, and sweep and scrub the floors. Sometimes, when she had done her work and was very tired and lonely, she would sit and watch the fire-fairies play among the cinders; and that is why they called her Cinderella.

One day Cinderella heard that the King was to give a very grand ball. The Prince was to be there, and all the great people were to dance with him. The proud sisters were going; but nobody thought of taking little Cinderella. And Cinderella was very sad.

"I should like to go," she sobbed, when she saw her sisters' lovely dresses. "Oh, I should like to go to the ball!"

But when the carriage came and took the sisters to the palace, poor little Cinderella was left all alone. She sat down on her little stool and cried till the big tears splashed down on her little brown frock, and Cinderella said to herself again and again: "I do want to go—I do want to go to the ball."

Then suddenly came a voice.

"And you shall go," said somebody.

Cinderella looked up, and there, standing at her side, was a fairy.

"I am your fairy godmother," she said. "Now, if you do just as I tell you, and ask no questions, you shall see what I can do."

She kissed Cinderella and wiped away her tears.

"First of all, you must fetch me a pumpkin," she said.

Cinderella ran into the garden, and brought the largest pumpkin she could find. The fairy godmother bent down and touched it with her wand, and suddenly, as quick as lightning, the pumpkin was turned into the grandest coach Cinderella had ever seen, with blue velvet seats and silver doors.

"Now I want a mouse-trap," said her godmother.

Away ran Cinderella, and when she brought the mouse-trap, with six mice in it, the fairy touched that, too. Suddenly, in a minute, the six wee little mice that were squeaking inside were changed into six lovely white horses.

"And now," said the fairy, "bring me the rat-trap and two lizards."

Cinderella brought them, and the fairy turned the rat into a coachman and the lizards into two great footmen.

Cinderella clapped her hands for joy, and did not know what to do because she was so happy.

"Shut your eyes!" cried the fairy.

Cinderella shut her eyes tight, and when she opened them again she found that she had on a beautiful frock, prettier than any she had ever seen, and on her feet were two little glass slippers. Then the fairy opened the door of the coach.

"Jump in," she cried, "and drive away to the ball! But remember one thing. Remember that *you must be home before the clock strikes twelve.* Promise me that you will obey me. Promise that you will do exactly as I say."

Cinderella promised, and drove off to the ball. When she got to the palace, who should come to meet her but the Prince himself. His coat was of blue satin, and at his side hung a beautiful sword with sparkling hilt. Taking Cinderella's hand, he led her into the ballroom, and everybody left off dancing to look at the Prince and the beautiful maiden whose name nobody could guess.

Cinderella enjoyed dancing with the Prince so much that she forgot all about the time and about her fairy godmother, until she caught sight of the clock. It was just going to strike twelve, and Cinderella became so frightened that she jumped up quickly and ran out of the ballroom as fast as she could go—so fast that one of her slippers came off. But she could not wait to pick it up. On she ran, through the ballroom and down the stairs, past the tall footmen, and as

CINDERELLA SAT AND WATCHED THE FIRE-FAIRIES PLAY AMONG THE CINDERS

The fairy is seen here touching the pumpkin with her wand and bringing out the wonderful coach. Cinderella is running downstairs as the clock strikes, losing her slipper, and the last picture shows her a kitchen-maid again, fitting on the slipper brought by the Prince's messenger, who, as soon as he finds that it fits her, drives her to the palace, where the Prince makes her his bride, and they live happily ever after.

she reached the door the clock struck twelve.

Cinderella trembled and ran out into the street, but, alas! the coach and horses had vanished. She looked at herself and found that her pretty dress had vanished too, and the little brown frock was there instead.

Poor little heartbroken Cinderella cried all the way home, and when the sisters came back from the ball they found her sobbing on the cold hearth among the cinders.

The next day the King's messenger went round the city blowing a silver trumpet, and all the people came out to listen. He said the Prince had found a glass slipper which belonged to a beautiful lady with whom he had danced at the ball. No one knew who she was, but she was so gentle and sweet that the Prince had fallen in love with her, and he said that if only they could find her he would marry the lady who could wear the glass slipper.

All the ladies of the land came to try on this wonderful glass slipper, but it was so tiny that none of them could wear it. At last the messenger came to the house where Cinderella lived. The stepsisters became so excited, and were so anxious to try on the slipper, that they could hardly wait to unfasten their shoes, and had to call for Cinderella's help. But when Cinderella saw the slipper she knew it at once. It was her shoe, which had slipped off at the ball when the clock struck twelve.

The two sisters tried and tried, but the shoe would not go on.

"Please do let me try it on," said Cinderella.

"You, indeed!" cried the sisters, pushing her away. "As if a kitchen-maid could wear such a shoe!"

But the messenger put out his hand and helped Cinderella into the chair. She took off her old shoe and put out her foot, and in a minute the wonderful slipper was on. It fitted perfectly.

Suddenly there was a sound like a rushing wind, and in a moment the fairy godmother appeared and with a touch of her wand Cinderella was a grand lady again, clad in all her ballroom finery.

She stepped into the coach which was waiting for her at the door and drove away with the messenger to the palace, where the Prince met her and made her his bride.

THE LEGEND OF THE WANDERING JEW

THE story is told that, as our Lord was carrying the cross up to Calvary, He stayed for a moment to rest by the house of a shoemaker, who drove Him away, saying: "Go on! Go on! You shall not rest here."

And our Lord took up the cross, and said: "I am going to My rest, and you must wander until I return."

So the shoemaker was turned into the Wandering Jew, who will never find rest until our Lord comes again on earth at the Day of Judgment. The mark of a red cross appeared on his forehead, and he left his wife and children, and followed our Lord to Calvary, and then he turned away from Jerusalem, and began his long, strange pilgrimage.

On and on he went, a barefooted, tall old man, with his hair hanging about his shoulders and a black bandage round his forehead to conceal the mark of the red cross there.

And on and on he still goes at the same striding pace, over mountains and across deserts, and down all the long, white roads of the world. But a little rest is sometimes allowed to him. If he happens to be passing by a Christian church on Sunday morning, just as the service is beginning, he can enter and stand there and listen to the sermon.

In 1505 a weaver in Bohemia, whose name was Kokot, was trying to discover some treasure which his grandfather had hidden in the royal palace. And as he was vainly digging here and there, with no plan and but little hope, the Wandering Jew passed by.

"Your grandfather was burying the treasure the last time I came by here," said the Wandering Jew, "and if I remember rightly, he was burying it beneath that wall there."

Kokot at once dug beneath the wall, and there he found the treasure. But before he could thank the Wandering Jew the strange pilgrim had passed out of sight.

THE END OF THE BOOK OF STORIES.

PRECIOUS, SEMI-PRECIOUS, AND GEM STONES

The precious, semi-precious and gem stones, fifty-two in number, illustrated in color on this plate, were selected from the finest gems of these sizes in the Morgan-Tiffany collection of the American Museum of Natural History, and from the collection of Messrs. Tiffany & Company. They were assembled and arranged by Dr. George F. Kunz, and include the precious stones of nearly every part of the globe. The weight of each stone is given opposite the name. You can identify the stone by the number and select the text relating to it by the key which appears on the opposite sheet.

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Key to Stones Shown in Colored Plate with Weight of Each

		Carats
1.	Diamond, Crystal, white..	5.94
2.	Diamond, white, Brilliant Cutting	2.07
3.	Diamond, pink	1.85
4.	Diamond, green	1.45
5.	Diamond, black	3.50
6.	Sapphire, blue, Fergus County, Montana	3.27
7.	Sapphire, blue, Burma...	5.94
8.	Ruby, Burma	1.16
9.	Sapphire, green, Siam	4.40
10.	Sapphire, yellow, Ceylon, Briolette	12.75
11.	Star Sapphire, Ceylon ...	27.33
12.	Chrysoberyl, Brazil	5.91
13.	Catseye, Ceylon	7.93
14.	Alexandrite, Ceylon	8.05
15.	Spinel, Burma	4.12
16.	Emerald, Colombia	2.08
17.	Aquamarine, Brazil	12.05
18.	Golden beryl, Connecticut	10.65
19.	Morganite (pink beryl), Madagascar	14.89
20.	Zircon, green, Ceylon	7.74
21.	Zircon, blue, Ceylon	12.63
22.	Topaz, yellow, Brazil	9.75
23.	Topaz, pink, Brazil	10.74
24.	Topaz, white, Briolette, Brazil	20.53
25.	Tourmaline, green, Paris, Maine	9.35
26.	Rubellite (var. Tourmaline), Mesa Grande, Cal.	11.43
27.	Tourmaline, bicolored, Mesa Grande, Cal.	22.17
28.	Zircon, brown, Ceylon ...	18.00
29.	Kunzite (var. Spodumene), Pala, California	10.90
30.	Hiddenite (var. Spodumene), North Carolina.	9.29
31.	Peridot, Egypt	10.92
32.	Garnet, precious, East Africa	8.96
33.	Carbuncle (var. Garnet), India	14.63
34.	Hessonite (cinnamon garnet), Ceylon	10.72
35.	Lapis Lazuli, Persia.....	
36.	Amazonite, Virginia	4.42
37.	Amethyst, Uruguay	10.55
38.	Spanish Topaz (var. Quartz), Spain	7.60
39.	Precious jade (Jadeite), Burma	6.57
40.	Chalcedony, scaraboid, Persia	
41.	Sard, scaraboid, Greece...	
42.	Sardonyx, India	7.13
43.	Bloodstone, India	5.29
44.	Chrysoprase, Silesia	5.19
45.	Carnelian, India	6.37
46.	Turquoise, New Mexico..	5.79
47.	Flame Opal, Mexico.....	17.40
48.	Black Opal, New South Wales, Australia	7.69
49.	Fire Opal, Queretaro, Mexico	6.24
50.	Moonstone, blue, Ceylon..	11.99
51.	Rose quartz, Madagascar.	13.34
52.	Malachite, Russia	8.47

Reproduction (actual size) of Precious, Semi-Precious, and Gem Stones

belonging to The Morgan-Tiffany Collection of the American Museum of Natural History and to Tiffany and Company, New York. Prepared under the supervision of Dr. George F. Kunz, Research Curator of the Department of Mineralogy of the American Museum of Natural History, Gem Expert of Tiffany and Company.

Weight 3,106 metric carats.* 530.2 metric carats. 317.39 metric carats.
The Cullinan Diamond and the two largest stones cut from it.

PRECIOUS STONES

By GEORGE F. KUNZ, Sc.D., A.M., Ph.D.

CONTINUED FROM 7192

BIRTH stones, or natal stones, are certain gems which are worn by those who, either through sentiment or by fancy, incline to the belief that wearing this particular gem will preserve them from harm. In the first century the Jewish historian Josephus described the breastplate of the high priest which is treated of in the Book of Exodus XXVIII: 15–30. The stones in this breastplate were set in four rows, with the names of the twelve Children of Israel engraved upon them, one on each stone. The modern names of these stones are generally thought to be the following:

Carnelian	Sapphire, or Hyacinth
Peridot	Banded Agate
Emerald	Amethyst
Ruby	Topaz
Lapis-lazuli	Beryl
Onyx	Green Jasper, or Jade

There can be no doubt that the custom of wearing birth stones was derived from these twelve stones of the breastplate. Indeed, Josephus expressly writes: "And for the twelve stones, whether we understand by them the months or the twelve signs of what the Greeks call the zodiac, we shall not be mistaken in their meaning." The twelve Foundation Stones of the New Jerusalem as given in the Revelation of John, and later assigned to the Twelve Apostles, have also served as a source for the belief in natal stones, but the modern custom cannot well be dated back more than two centuries or so, and would seem to have originated in Poland among Hebrew gem-traders. It is a very attractive idea, for the stones are durable, and the sentiments attached to each have been handed down for many centuries and by many races of people, and, in fact, there are often two or more natal stones for a single month.

The generally accepted list of natal gems is as follows:

January—Garnet
February—Amethyst
March—Bloodstone or Aquamarine
April—Diamond or Sapphire
May—Emerald
June—Pearls or Moonstone
July—Turquoise
August—Carnelian
September—Chrysolite or Peridot
October—Beryl, Opal or Tourmaline
November—Topaz
December—Ruby

The ruby is occasionally used for July, and the turquoise for December.

* Size 3½ x 2½ x 2⅛.

Before proceeding to describe separately each of the stones on our list, let us learn something of the way in which gems are prepared for us. Very few stones are set as they are found, because they need to be cut and polished to show their beauty. Otherwise they might seem dull, irregular or opaque. The practice of cutting stones is very ancient. The Phœnicians may have learned it from the Egyptians or possibly from the Babylonians. Stones may be cut in many different forms, such as the cabochon, table, step, rose or brilliant. They may be cut in curved surfaces, as are the star sapphires, or else in facets (small faces), like the diamond. Before the fourteenth century they were usually given curved surfaces; later the transparent stones, except the garnet, were cut with facets. When the garnet was cut with a curved surface it was called a carbuncle. Many of the opaque or translucent stones are cut *en cabochon,* that is, with smoothly rounded tops; for instance, opals, moonstones and turquoises.

Diamonds are rarely cut in rose form, that is, with facets which are triangles of nearly the same size. When cut in this way the diamond is not so beautiful and has little fire; therefore only the less valuable stones and the very small ones, 500 to 2,000 to the carat, are cut after this fashion.

The form of cutting which imparts the greatest brilliancy is that called the brilliant cut. It has 58 facets, 33 above, including the table, and 25 below the band, or girdle, around the stone at its widest point. The setting grasps this girdle and holds the stone in the ring, pin or pendant. The facets are of various forms and size, and have different names, as star, skew, and the like. It is said that the art of cutting diamonds into facets was discovered or introduced in Europe in 1456.

DIAMOND-CUTTING IS A TEDIOUS PROCESS

The cutting of diamonds is a process requiring great skill and judgment, and is at the same time a very tedious one. While in many instances diamonds are cut along the lines of their natural form, in other cases it is found advantageous to cleave off those parts which would be lost if the diamond were shaped immediately. In other cases, again, it is considered advisable to saw a diamond in two, so as to secure two stones the combined weight of which would be greater than that of a single stone secured by direct cutting. Furthermore, diamonds are cleaved to remove spots or fractures.

As a preliminary the cutter polishes a small surface of the rough diamond submitted to his judgment so that he may see clearly the interior conditions and decide upon the point of cleavage. This having been determined, he holds a dull knife along the cleavage plane and gives the knife a sharp blow with a hammer, whereupon the diamond is split into two or more sections. Each of these is in turn imbedded in fusible metal and is firmly adjusted so that it can be brought in contact with a toothless buzz-saw of phosphor bronze having a thickness of from four- to five-thousandths of an inch and making over three thousand revolutions per minute. In spite of this great speed, twenty-four hours of uninterrupted work would be needed to make a cut a half-inch deep in a diamond, and as it is necessary to interrupt the work at intervals to allow the saw to cool off, the operation lasts several days.

HOW THE FACETS ON THE STONE ARE MADE

The sawing having been accomplished, the next stage is the actual cutting of the diamond. The first stage is that of "brutage," so called, one diamond being rubbed against another. To this end one of the stones is imbedded in lead and is fastened in the centre of a revolving wheel, the other diamond being affixed in a similar way to the end of a movable holder, so adjusted that the movement of the wheel causes one of the stones to rub against the other. By shifting the relative positions of holder and wheel the point of friction is changed at will, so that the required shape is given. The top, or table, facet is first made; then the culet, or flat bottom facet, is formed; lastly, the long facets extending from the table to the edge and the small facets. In the final stage the approximately shaped diamond is partly buried in fusible metal contained in a "dop," or cup-shaped holder, and receives the definite polish by contact with a wheel of highly tempered steel about twelve inches in diameter and making over three thousand revolutions a minute. The point of contact with the diamond is the edge of this wheel. This

operation is a very delicate one, for a moment's carelessness may ruin a fine stone; hence only workers of superior skill can attempt the difficult task of cutting a valuable diamond.

WHAT IS MEANT BY THE WORD CARAT

The "carat," as a weight, is used for weighing precious stones. The word is said to be derived from the name of a seed which was once used in the East as a weight. Nowadays jewelers do not use the seeds, but the name carat is still retained. A little more than 155½ of the modern metric carats of 200 milligrams equal one ounce troy. The fourth part of a metric carat is employed for weighing pearls and is termed a "metric grain." There are 5,000 carats in a kilogram, or 20,000 pearl grains. There is another kind of carat used to indicate the proportion of gold in a given mass; this is one twenty-fourth part. If a ring is marked "eighteen carats," this means that eighteen parts are of pure gold and six parts of some other metal, usually copper, or copper and silver.

THE GARNET VARIES IN COLOR AND HARDNESS

The garnet is usually blood-red, or dark red, or else of a purple-red hue, although it may be green, yellow, brown, or even black. It varies somewhat in hardness as well as in color, for while some will scratch quartz, others again may be scratched by quartz. Some are transparent, and some are opaque. The name comes from the Latin *granatum,* of *pomum granatum,* signifying a pomegranate.

Commercially the only varieties sold by the jeweler are: the red pyrope; the purple almandite, or almandine; the pale rose-colored purple rhodolite; the pretty yellow or yellow-brown essonite, or hyacinth, as it is named; and the green demantoid from Syssarsk, a Uralian Russian region. Of the various types, the finest almandine garnets come from India; some are found in Australia. These almandine garnets, when cut with dome tops, were known to the ancients as carbuncles (colored plate, No. 33). Garnets of richest red hue, the pyrope garnets, come principally from Bohemia, Arizona and South Africa. The demantoid are exclusively products of the Urals, Russia. They are usually sold as olivines, which they are not.

THE AMETHYST (COLORED PLATE, No. 37)

Amethyst is a variety of quartz and varies in color from a light, almost purple hue to a clear dark purple. The dark reddish purple is the most highly prized. Amethysts of gem quality have been found in many parts of the United States —in Georgia, North Carolina, Virginia, Maine, New Hampshire and Pennsylvania—but the finest stones come from Siberia, Uruguay, the Auvergne, Brazil and Ceylon. The rich dignified color commends it, and it is also used as a mourning or semi-mourning stone, and is often given to elderly people.

THE BLOODSTONE (COLORED PLATE, No. 43)

This is a closely compact, cryptocrystalline variety of quartz having red spots or streaks. It was used as a talisman by the ancient Egyptians and Babylonians; at the present day it is favored for signet-rings. The Mexicans were wont to cut the bloodstones into a heart-shaped amulet because they believed that it was a remedy for heart trouble and that it staunched bleeding. The finest bloodstones come from India, and some excellent material has been found in Oregon. In olden times it was often engraved with sacred subjects; sometimes the red spots were so utilized by the gem-engraver that they figured drops of blood falling from the head of Christ when wearing the Crown of Thorns.

BERYL, AQUAMARINE (COLORED PLATE, No. 17)

The aquamarine variety of beryl, so named because its blue, blue-green, or bluish green hue so much resembles the greenish blue of sea-water, is found in many places, the best gems coming from Brazil, Madagascar, Russia, Siberia; occasionally they have been found in the United States, especially in California, North Carolina, Massachusetts, Maine and Connecticut. Probably the largest and finest aquamarine ever seen was discovered in 1901 by a miner in Brazil. This stone, although it shows shades of green and blue, is so clear that one can look through it as though it were sea-water, and yet it was a big crystal nineteen inches long and weighing 243 pounds. In 1922 a wonderful deep blue crystal weighing over 60 pounds was found.

Aquamarine is a gem of great beauty of color and brilliancy. The yellow variety of beryl has been called "golden beryl," and the pink beryl has been named by the author "morganite," after the late J. Pierpont Morgan. Of this latter gem-stone Madagascar has furnished some very fine examples.

THE DIAMOND (COLORED PLATE, Nos. 1-5)

Diamond possesses all the characteristics that entitle it to be named the "King of Gems." When cut, it possesses more excellent qualities than any other gem; in fact, it seems to combine those of all the others and to possess many more besides. It is the most brilliant and the hardest substance known, and has, moreover, many properties that make it especially valuable in the arts. It is used to cut glass, to engrave gems and glass, to trim and engrave metals, to trim granite and other hard stones, and in its amorphous, or colloid, form it has furnished drills which have enabled us to reach depths of over 6,000 feet through hard rock.

In its natural, or uncut, form the diamond possesses little beauty and frequently resembles quartz grains or pebbles. It is composed of the single element carbon, with a hardness of 10, and yet it is identical with the softest known mineral, graphite, with a hardness of 1, the so-called "black lead" used in pencils and for crucibles. It phosphoresces when exposed to the Roentgen rays, or radium, and is transparent to the Roentgen rays, whereas glass and all other white gems are opaque or nearly so.

The three important sources of supply are: South Africa, which now furnishes more than 95 per cent of our diamonds, Brazil and India. In early times India was the exclusive source of the diamond; then came its discovery in Brazil in 1728, and later in South Africa in 1867. Recently it has been found in the United States. Diamonds are grouped under different names according to their shades of color. The most valuable are those said to be of "the first water," pure white stones. The blue "Hope Diamond" of 45.42 metric carats is the most famous colored diamond, but red, rose, black, green, mauve and salmon-colored shades are also known. But few tests can be applied with safety to determine whether a diamond is genuine or no, unless by an expert.

EMERALD (COLORED PLATE, No. 16)

Emerald is the grass-green or blue-green variety of beryl found especially in Colombia, South America. In ancient times it was also found in Egypt, and it occurs in Russia and Australia; some few have been mined in North Carolina. In ancient Mexico the jadeite was incorrectly called emerald, and bore in the native language the designation "quetzalitzli," meaning the stone of the quetzal, because its beautiful green color resembled the golden green plumage of the Mexican bird the quetzal, sometimes called the long-tailed paradise trogon. The plumes of this bird were often worn by the rulers in Mexico and in Central America, and so this supposed emerald came to be regarded as a royal gem.

Superstitious people used to think that this stone was a charm against illness when worn suspended from the neck. One of the most famous rings in history, the Ring of Polycrates of Samos (who died 522 B.C.), was set with a large emerald engraved by Theodorus of Samos, the greatest master of the art of gem-engraving at that time. The finest emerald now in Europe was one which belonged to the former emperors of Russia. An almost perfect emerald is exceedingly rare. Since 1910 the finest emeralds have commanded from one to five times the price of the finest diamonds of equal size.

THE PEARL, WHICH IS NOT A PRECIOUS STONE

Pearl is called a gem, but is, strictly speaking, an animal production. It has a very humble origin, for it grows up within the pearl oyster, having as a nucleus a small parasite or a speck of sand which has found its way therein, and which the mollusc covers over with successive layers of nacre to allay the irritation it causes. The covering of nacre, or pearly substance, is of the same composition as that which lines the pearl-shell. There is a mineral layer, partly crystalline, and an animal layer of conchyoline. Most pearls are white or cream-colored, but some are roseate and others are black, gray or yellow.

Although the pearl is not of mineral origin, it is classed with the most valuable precious stones. It is somewhat delicate, and may lose its beauty if roughly handled or exposed to great heat,

but pearls have been boiled for some minutes without apparent injury. If a pearl is cut across the middle and examined under the microscope, it will show a number of layers, or rings, and thus resembles an onion in structure. Some pearls are shaped like a button, others are pear-shaped, but the finest are perfectly round. Pearls were known to the Greeks and Romans and were greatly valued by them long before the diamond was known or appreciated. A beautiful round white pearl called the "Pelegrina," as large as a pigeon's egg and weighing 134 grains, was one of the most highly prized gems of the Spanish crown. The largest pearl known, of irregular shape, however, is in the South Kensington Museum, London, and weighs three ounces. Necklaces of well-matched and graded pearls have brought fabulous prices, even up to $500,000, $1,000,000 and over.

The pearl oyster grows in warm waters in many parts of the world. Many or most of the finest pearls come from the fisheries of Ceylon or from the Persian Gulf, but splendid gems have been found in Australia, around islands in the Pacific, in the Gulf of California, and in the Caribbean Sea. Some of the mussels in the streams of the United States yield "fresh-water pearls," often of great beauty. They have been sold for from $1,000 to $10,000 each. A notable instance is the magnificent 93-grain pink pearl found in Notch Brook, New Jersey, in 1857, which was eventually bought by Empress Eugénie at a large advance over the 12,500 francs paid for it by a French gem-dealer.

THE MOONSTONE
(COLORED PLATE, No. 50)

Moonstone in India is considered a sacred stone and is supposed to bring good fortune. Whenever displayed for sale there it is placed on a yellow cloth, as yellow is a sacred color. It was believed to help the course of true love to run smooth, and it was even thought to give the wearer an insight into the future. It has a milky blue color and a soft lustre with either a moon-like reflection or often a soft blue chatoyance. Usually it is cut *en cabochon,* that is, with a rounded top. The moonstone is the adularia variety of feldspar mined in Ceylon. This stone has never been found in the United States, but much deception has been practiced on the visitors to the beaches both of the Atlantic and Pacific coasts.

THE TURQUOISE
(COLORED PLATE, No. 46)

Turquoise has been praised by many poets. When, in Shakespeare's Merchant of Venice, Jessica elopes and carries away her father's jewels, old Shylock grieves bitterly over the loss of his turquoise ring, which he would not have traded for a "wilderness of monkeys."

Four thousand years ago these stones were mined by the Egyptians in the desert of Sinai, and they were found in the southwestern part of our land before the discovery of America. Rivaling the oldest mines in age are those of Nishapur in northwestern Persia, where the finest turquoises are still found. Our chief sources in the United States are New Mexico (colored plate, No. 46), Arizona, Nevada and California. A great many are now cut in America and shipped to Europe. The name of the stone shows that in medieval times the Europeans got their turquoise, or "turkis," as they called it, from Turkey, for the finest Persian stones came by way of Turkey.

In former times the wearer of a turquoise was believed to be protected from falls, or at least from serious injury in case of falling. In our day, in Tibet it is thought to bring good fortune and to guard against the spell of the "Evil Eye." Another superstition which long endured was that the turquoise would grow pale when the wearer was ill and would regain its beautiful color on his or her recovery.

Turquoise is a phosphate of lime, and when of a beautiful blue color it is a much-desired gem. The prehistoric dwellers in Mexico and southwestern United States mined it and made wonderful objects of adornment with it, covering human skulls and also shields and other ornamental articles with an incrustation of mosaic inlays of turquoise.

THE SARDONYX
(COLORED PLATE, No. 42)

Sardonyx, as its name indicates, is composed of layers of sard and onyx. The layer of sard is of a deep brown or reddish color, while the onyx should have the delicate pink tint of the finger-nail. These stones are often used for cameos. One of the most famous in the world is a sardonyx cameo upon which Queen Elizabeth had her portrait cut, and which she gave to the Earl of Essex as a pledge of her friendship. When sentenced to be executed, Essex sent this stone to Eliza-

beth, hoping that it would revive the memory of her former regard and would induce her to pardon him. Through some mistake the gem came into the hands of the Countess of Nottingham, an enemy of Essex, who refused to deliver the ring, and as a result Essex was beheaded. It is told that on her deathbed Elizabeth refused the plea for forgiveness made by the Countess, saying, "God may forgive you, but I do not."

THE PERIDOT
(COLORED PLATE, No. 31)

Olivine and chrysolite or "golden stone," are all names applied to the olive-green peridot. It is occasionally called "evening emerald" because of its bright green color at night, and is sometimes designated "Job's Tears" on account of its shape. The stone is usually cut *en cabochon,* but a "table step-cut" form is considered more valuable. As it is rather soft and easily scratched, it is not so often worn in rings as in pins.

Most of the best peridots come from a little island called St. John, on the western side of the Red Sea. The choicest found their way into the cathedral treasures of Europe and were commonly called emeralds. The most famous of these are in the Treasury of the Three Magi in the Cathedral of Cologne. A few very fine peridots were found not long ago in an old house in Alexandria, where they had probably been buried with the idea that they would bring good luck to the building. Some light green stones come from Queensland, and some bits of peridot have been found in the United States. Strange to say, specimens of some size, sufficiently large to be cut, have been brought to the earth in meteoric stones. These can truly be called celestial gems.

THE SAPPHIRE
(COLORED PLATE, Nos. 6-11)

Sapphire is the symbol of truth and virtue. This royal stone, called by old writers the "gem of gems," has always been popular with lovers of precious stones because of its beautiful blue color. Most sapphires are of a clear blue shade, varying from a pale blue to a deep indigo-blue. However, we see some stones which are white, some which are yellow, and even some of a greenish blue hue. Except in color, the sapphire is the same as the ruby, both stones being composed chiefly of a substance called alumina. The stone does not appear to great advantage at night.

Ceylon is famous for its sapphires, but many fine ones are found in Siam, and they also occur in Burma. In Siam they appear in clay which contains gravel, and usually at a depth ranging from two to twelve feet. The gravel and sand containing the gems are carried to a stream in large bamboo baskets with a point at the bottom. The basket is then placed in a current of water, and its contents are carefully washed until the clay has been separated. As these gems are heavier than the common stones, they settle at the bottom of the basket and are then picked out by hand.

Rivaling the Asiatic sapphires are those found in Fergus County, Montana, especially, and also in Idaho. Here they have been successfully mined for a number of years. In Australia the state of Queensland has also produced many sapphires of various qualities, from the superior grades to those used in watchmaking.

THE OPAL
(COLORED PLATE, Nos. 47-49)

Opal was the favorite stone of Queen Victoria, and she always loved this white, fire-flashing stone, the symbol of hope. This gem shows many colors—the green of the emerald, the soft purple of the amethyst, the red of the ruby, and the blue glints of the sapphire. The play of colors is caused by tiny fissures crossing in all directions, and is due not to any coloring matter, as in the case of nearly all other colored precious stones, but to the dispersion of light.

Most of the opals come from Hungary, but lately many fine ones have been brought from Australia. They are also to be found in Ceylon, Iceland, Mexico and the United States. It is said that when the opal is first taken from the mine it is colorless and transparent, but after it has been kept in the light for a time the violet shade appears, followed by the other hues.

A very famous opal which belonged to the Empress Josephine was called the "Burning of Troy," on account of the tiny tongues of red flame it showed as if it were on fire. There are some very fine opals from Hungary among the Crown Jewels of Austria. Recently some beautiful black opals were found on Lightning Ridge, New South Wales, Australia, in a

desolate region called the "Never-Never-Land." No two of these stones were exactly alike. Some show flashes of blue glowing flame, others have intricate patterns of molten green and twinkling red. A stone which appears to have dancing flakes of sapphire-blue, when turned to another position in the light, will show flashing gleams of yellow and red. As they are rare, the black opals are very costly.

THE TOURMALINE
(COLORED PLATE, Nos. 25-27)

Tourmaline occurs in a great variety of colors and is one of our most beautiful gems, as it may be said to offer all the color-scale of the rainbow. Some varieties are brown, others are red, others again are blue and some are even black, while pink, green, yellow and a host of intermediate shades are plentifully represented. A striking peculiarity is the frequent zoning of the colors in bands or in concentric circles. In the stones found in Brazil the core is often red surrounded by white, with a green shade on the outside. Specimens from the mountains of southern California show a green core surrounded by white, with red in the exterior ring, just the reverse of the Brazilian stones. Delicate shades of green, violet and brown are sometimes combined in specimens from Ceylon and Pegu. The island of Elba produces tourmaline crystals black at one end, red at the other, with yellow in the middle. The tourmaline is found in many parts of America, especially in New England, Quebec and Ontario. It was first found in Maine by two boys who were interested in minerals. They were coming home from a walk when they saw something green near the foot of a tree. They picked up a few pieces of this green stone, but as the snow was falling very fast, they returned home and came later to the spot, when they found a number of very beautiful crystals. This mine is like Aladdin's cave, for over forty varieties of the tourmaline have been found there.

According to the difference of color the stone bears several names. The pink or red shade is called rubellite, those of a beautiful indigo-blue have been named indicolite, while the colorless variety is indicated as achroite. The green Brazilian tourmaline has been popularly known as "Brazilian emerald." When cut into settings for rings the red tourmaline looks so much like a ruby that it is often mistaken for one. A pretty tale by Saxe Holm (Helen Hunt Jackson) is entitled My Tourmaline and tells of the finding of a wonderful specimen.

THE TOPAZ
(COLORED PLATE, Nos. 22-24)

Topaz is most commonly yellow, but not all are of this color, for when subjected to great heat it can be turned pink. In fact, you will have no difficulty in matching a topaz with your dress, for it is found in an almost endless variety of colors. The finest stones are of a bright citron shade, at times showing a clear golden color. The greater part of the gems come from Brazil, but they are also found in many other parts of the world, as England, Russia, Saxony, Australia and the United States. Sometimes a large white topaz is mistaken by ignorant persons for a diamond, and a crimson topaz has been substituted for a ruby, while the green shade has been called an emerald, and the blue shade has been mistaken for a sapphire. The simplest tests, however, serve to avoid these errors.

The largest topaz on record was found in Brazil a few years ago, and weighed in the rough state 11½ pounds. It took several months to cut the huge stone. The Maxwell-Stuart topaz is a stone which was first thought to be only a piece of quartz, but it later proved to be a topaz weighing 308 carats.

THE RUBY
(COLORED PLATE, No. 8)

Ruby, when fine and large, is one of the most valuable of all stones of its size. The very name "ruby," from Latin *rubeus,* "red," and the Greek designation *anthrax,* "a live coal," indicate its fiery color—a vivid red, which sometimes indeed has a tinge of purple or of a pale rose-red.

Upper Burma provides the greater part of the fine rubies of our day. A few have come from the gem sands of Ceylon; some are found in Siam; others come from Madras and Mysore, India; and a smaller number from Afghanistan and Australia. In the United States rubies have been found in North Carolina and in Montana. Many Eastern tales and legends mention the ruby, but a number of stones which were not rubies—almandine garnets, for example—have been called by that name. One of the largest

rubies ever found was discovered a few years ago in one of the Burmese mines. It has the altogether exceptional weight of 42 carats. Coming to light, as it did, just about the close of the World War, it was named the "Peace Ruby." A value of £20,000 was put upon it. Since then the Burma mines have furnished another very large ruby, of the finest pigeon's-blood hue; this stone weighs 21 carats and has been estimated at £12,000.

THE LAPIS-LAZULI (COLORED PLATE, No. 35)

Lapis-lazuli, or azure stone, is of a rich blue color and shows specks of iron-pyrites of a golden hue. It is far more intense in color than is any other opaque blue stone. The best come from Afghanistan, on the Oxus River in Asia, although some stones are found in Persia and China. To obtain it the rock in which it is must be split by fire. For many centuries lapis-lazuli was considered very valuable, and four thousand years ago it was paid as tribute to the Egyptian kings, and later to the Assyrian. It was especially prized for its wonderful color—blue with golden spots. By the Hebrews, Greeks and Romans it was known as the sapphire. However, it appears most probable that in later Greek and Roman times the *hyacinthus* signified our sapphire, and this is almost certainly the case with the second Foundation Stone of the New Jerusalem in Revelation. It is not always of a deep blue shade, but varies from a pale blue or greenish blue to a pure green. When pulverized and prepared it provides the beautiful ultramarine of artists.

Large diamonds are now of more frequent occurrence than was the case before the South African mines were discovered and worked. Before 1867 the world depended first upon India and then, since 1728, upon Brazil. Still, only about a hundred diamonds weighing over 100 carats can be listed to-day. Some of the great diamonds of earlier times have had strange and romantic histories. The great Russian diamond known as the Orlov is said to have once formed one of the eyes in a statue of a god in a Brahman temple at Mysore, but a French soldier who got himself appointed as a guardian of the temple plucked out this beautiful eye and ran away with it. It was stolen from him by another thief, the captain of an English ship in which he had taken passage for Europe. The captain sold it to an Armenian gem-dealer in London. Finally it was acquired by Prince Grigori Orlov, who presented it to Catherine II of Russia. It was set in the top of the Imperial Russian sceptre and was prized as one of the most beautiful stones in the world. It was about the size of one-half of a pigeon's egg, was of a slightly yellowish shade, and weighed 194¾ old carats, or almost exactly 200 metric carats. It has been valued at over $1,500,000. Since the Russian Revolution it has been lost to sight, though strange rumors about it have come to us.

THE CULLINAN, THE LARGEST DIAMOND EVER FOUND

The largest diamond ever found was in reality only three-fifths of the original crystal. The missing fragments may be discovered some day. In spite of its great intrinsic value and latent beauties, an immense diamond crystal is not a very beautiful object, and might at first sight be mistaken for a piece of ice or for a rough quartz crystal. The Cullinan Diamond was found in the Premier Mine in the Transvaal in 1905. It weighed in the rough 3,106 metric carats and measured, before cutting, 3½ x 2½ x 2⅛ inches. In 1907 it was purchased by the Transvaal Government for the sum of a million dollars and was presented to King Edward VII by the Union of South Africa on his birthday, November 9. In the following year it was cut up in Amsterdam into nine large brilliants and a number of small ones. The largest gem, which adorns the State crown of England, and has been named the "Star of South Africa," weighs 530.2 metric carats. The next in size, sometimes named "Queen Mary's Diamond," weighs 317.39 carats and ranks second among the great diamonds. At the head of this recital are shown the original crystal and the largest gems cut from it.

THE EXCELSIOR DIAMOND, WHICH WAS SECOND IN SIZE

Before the discovery of the Cullinan Diamond the Excelsior, weighing 995.21 metric carats and measuring 2½ inches in length, was the largest diamond crystal that had ever been found. The man who picked it up while loading his truck at the mine was given $2,500 in money and a horse with bridle and saddle. This stone was eventually cut

up into ten brilliants ranging in weight from 13.86 carats up to 69.80 carats, which were sold in the United States.

THE REGENT DIAMOND, AND ITS STRANGE HISTORY

A large round crystal weighing 440 carats was found in an Indian mine in 1701 by a negro slave, who concealed the discovery and fled with the stone to the coast. He was destined to meet a tragic end, for he was thrown overboard by the captain of an English ship in which he had embarked so as to take his great stone to England. Finally the diamond came into the hands of a Parsee dealer, who sold it to Thomas Pitt, the English governor of Fort St. George, Madras. He sent it to England and had it cut into a brilliant of 136⅞ carats (140.64 metric carats), which he sold in 1717 to the Régent Duc d'Orléans for the crown of France; it adorned the coronation crown of Louis XV in 1722. It was stolen in September, 1792, during the French Revolution, and was hidden in the wall of a garret room, but the place of concealment was before long betrayed by one of the thieves and the diamond was recovered. It is one of the very few of the French Crown Jewels that were not sold in May, 1887, and it is still to be seen in the Louvre Museum, Paris.

THE "KOH-I-NUR," OR "MOUNTAIN OF LIGHT"

The history of this, the most remarkable of historic diamonds, has been dated back with some probability to the time of Sultan Ala-ed-din of the Khilji dynasty, who reigned from 1288 to 1321, and there is a tradition that he had taken it in 1304 from a rajah of Malwa, in whose royal house it had been for centuries an heirloom. It was secured as a spoil of war after the battle of Paniput, April 26, 1526, by Humayun, son of the Mogul Emperor Baber, but was yielded by the later Mogul Emperor Mohammed II to the Persian conqueror Nadir Shah in 1739; indeed, the latter is said to have named it "Mountain of Light." Nadir's weak successor, Shah Ruhk, was forced to surrender it to the Afghan chief Ahmed in 1751, and a descendant of the latter, Shah Shujah, was constrained in his turn to give it up to Runjit Singh, the "Lion of the Punjab." Finally, in 1849, Runjit's successor surrendered it to the East India Company, which bestowed it upon Queen Victoria, to whom it was finally presented in 1850. In its Indian cutting it weighed 186 1/16 (191.10 metric carats), but it was recut in London in 1852, its weight being reduced to 106 1/16 (108.38 metric carats). Though the size was so considerably reduced, the brilliancy of the stone was much improved by the new cutting.

THE SANCY DIAMOND, AND ITS VARIED HISTORY

The Sancy has sometimes been called the "Sphinx of Diamonds," and the true explanation of this is that the stories of two or three different stones have been blended together more or less successfully. The first reliable record of the Sancy shows it in the possession of Nicholas Harley de Sancy in the latter part of the sixteenth century. He is conjectured to have bought it in Constantinople when representing French interests there. In 1604 he found a purchaser in James I of England, and the diamond remained in the English Treasury until the political troubles of Charles I forced him to send the Sancy with other choice jewels to the Continent to raise money for Royalist troops. Queen Henrietta Maria managed these delicate transactions. The Sancy was pawned, but was redeemed later by Cardinal Mazarin, who bequeathed it with seventeen other fine diamonds to the French crown. In 1792 it was stolen, and was not traced as was the Régent. It was first taken to Spain and then passed through many hands, belonging at one time to a rich Parsee, Jamsetjee Jeejeebhoy; later it was acquired by the Indian potentate, the Maharaja of Puttiala. Finally it was brought back to Europe, and was bought by Baron Astor for his daughter-in-law the present Viscountess Astor. Its weight is 55.23 metric carats.

In many recitals this stone is said to have been that worn by Charles the Bold at the battle of Granson in 1476, and lost by him in his disastrous defeat there by the Swiss. But this diamond, which the Swiss Confederates did not succeed in selling until 1492, came at last into the hands of Johann Fugger, the great banker and moneylender of Augsburg, and was sold by him to Henry VIII of England just before the latter's death in 1547. It entered the collection of the English Crown Jewels, being set in an elaborate brooch with rubies and pearls. It is not a little strange to note that this brooch

with Charles the Bold's diamond so far shared the fortunes of the real Sancy that it was sold, or pawned, in Amsterdam by representatives of Charles I of England, and for a similar purpose.

THE HOPE DIAMOND IS THE LARGEST BLUE DIAMOND

This diamond is interesting, as it is the largest blue diamond known. It is called the "Hope" because it once belonged to a famous banker of that name. It weighs only 44¼ of the older carats, or 45.42 metric carats, but it is probably the most valuable diamond of its size in the world. Little is known of its earlier history, though some people suppose that it was stolen with other stones from the French Crown Jewels at the time the Régent diamond was taken. It was exhibited in the London Exposition of 1851.

An engraved diamond was given in 1829 or 1830 by Prince Khusrau, son of the Persian Crown Prince Abbas Mirza, later Shah of Persia, to the Russian Tsar Nicholas I as a peace-offering to placate the tsar for the murder of his ambassador in Teheran. The writer knows that it still bore in 1923 the names of Akbar Shah, Nisim Shah and Fath Ali Shah engraved in carefully executed Arabic characters. The last-mentioned monarch ascended the Persian throne in 1797. The inscriptions were engraved on polished faces of the crystal.

The German mineralogist Gustav Rose, when he visited St. Petersburg about 1830, was favored with a sight of this historical diamond. The presentation to Tsar Nicholas had taken place but a very short while before that time. Rose describes the diamond as being especially interesting because some of the surfaces of the original octahedral crystal had been left in their natural state, while others had been polished. The stone weighed 86 carats (88.19 metric carats), and, as we have noted, the inscriptions had been cut on the polished surfaces. Around the upper end of the diamond ran a narrow ridge, probably made in order to allow a cord to be passed along it, so that the gem could be worn suspended from the neck.

There are many other large diamonds in existence, such as the Stewart of 123.25 metric carats, the Porter Rhodes of 69.96 carats, the Tiffany Yellow of 128.51 carats, the Jubilee of 245.19 carats, the largest cut stone except the two Cullinans; but no one of them has a particularly interesting story. They are simply large and beautiful stones of great value.

Precious-stone collections belonging to museums and colleges of the United States contain many of the rich and interesting precious and semi-precious stones.

The most notable is at the American Museum of Natural History in New York, which possesses the Morgan-Tiffany Collection of Precious Stones formed under the direction of Dr. George F. Kunz. It contains over four thousand specimens, consisting of series of diamonds of various colors, sapphires, topazes, tourmalines, kunzites, peridots, opals, amethysts, rock crystals, a great variety of pearls from all known shells and the shells in which they were contained, the largest perfect star sapphire in existence, weighing 543 carats, a fine blue sapphire of 163.93 carats, a topaz of 615 carats, and many interesting and curious examples, as well as a collection of 24 engraved cylinders representing the various precious stones of Babylonia from 4000 B.C. to 1000 B.C.

This collection represents twenty-five years' collecting. Not only does it illustrate the various kinds of precious stones, but it also illustrates every known form of cutting.

The second collection in importance is that formed by Tiffany & Company for the 1893 Chicago Exposition, also formed under the direction of Dr. Kunz, and purchased by the Field Museum in Chicago. It contains many remarkable and unique examples illustrating all forms of gem-cutting, as well as their application in East Indian jewelry, of which this collection is the finest in existence; an interesting collection of very remarkable pearl shells, one pair of which from the Sulu Archipelago weighs 151 ounces; the Mexican sun-god opal; and nearly every known variety of precious stones.

The collection at the United States National Museum, based upon the Dr. Isaac Lee Collection, is a very comprehensive and beautiful one. There are others, also formed under the direction of Dr. Kunz, in the Golden Gate Museum, San Francisco, California, at the New York State Museum at Albany, and at Amherst College, Amherst, Massachusetts.

THE END OF THE BOOK OF FAMILIAR THINGS.

CHIEFTAINS OF A VANISHING RACE

The red men of North America who once roamed over the greater part of the continent are no longer powerful. A brave and picturesque race, they have always numbered among their tribes men with noble souls, like the chief described in the story The Last of the Mohicans, on page 267.

Photo, courtesy Department of Indian Affairs, Washington, D. C.
Fort Lapwai Sanitarium.

INDIANS OF THE UNITED STATES

CONTINUED FROM 7200

IN every state of the Union there are descendants of the Indians, the original owners of the North American continent. According to the United States Bureau of Indian Affairs, their numbers are increasing. Toward the end of last century the Census reported 226,000 Indians in continental United States. The figures given out on June 30, 1924, showed that the number had jumped to 346,902. At one time the Indians seemed to be dying out through disease because they could not adapt themselves to civilized life. In late years the Indians have improved in health. They have in many cases adopted the white man's ways and his outlook. Many have become self-supporting and ambitious.

On June 2, 1924, all Indians within the territorial limits of the United States became citizens of the United States. An act of Congress conferred voting rights upon Indians on the same terms as whites. This ended a grievance under which educated and thinking Indians had been smarting for many years. To understand how deep this grievance was, it is necessary to look back into history for a moment. It is a matter of record that when white men first landed in North America the Indians received them in a kindly manner, and relations between such settlers and Indians were friendly. But with the arrival on these shores of men who ignored Indian hunting rights and treaties, trouble began. From 1776 to 1870, the "century of dishonor" in regard to the white man's attitude toward the Indians, there were disastrous Indian wars, with great cost in life and money.

In 1786 the Government had begun a policy of setting aside "reservations" on stated areas of land for the natives. This was done to provide them with homes and land for cultivation, and also to keep them more easily under control by confining them within given limits. These early reservations were formed chiefly as the result of cessions of land; that is, the United States Government would force the Indians to sign a treaty giving up their rights to ownership and in return the Government would "allot," or reserve, for such Indians certain sections. Local greed was stronger than Government plans, and the Indians were robbed right and left without any real opportunity of obtaining justice. It could be said with truth that during that century the white men were try-

ing to do away with the Indian problem by exterminating the Indians.

It was President Grant who, in 1869, adopted another method of dealing with the original possessors of this continent. In his message to Congress on December 6 of that year Grant said:

From the foundation of the Government to the present the management of the original inhabitants of this continent—the Indians—has been a subject of embarrassment and expense, and has been attended with continuous robberies, murders and wars. From my own experience upon the frontiers and in Indian countries, I do not hold either legislation or the conduct of the whites who come most in contact with the Indians, blameless for these hostilities. The past, however, cannot be undone, and the question must be met as we now find it. I have attempted a new policy toward these wards of the nation—they cannot be regarded in any other light than as wards—with fair results, so far as tried, and which I hope will be attended ultimately with great success.

Photo, courtesy Department of Indian Affairs, Washington, D. C.
The modern home of Tolyaulkt, a Nez Percé Indian of Lapwai, Idaho.

This "peace policy," as the President's plan was nicknamed, had as its foundation the idea that the problem arising between Indians and whites might be solved by keeping the races apart. To that end all the tribes were given reservations, and the Government tried to keep the Indians docile and peaceful by doling out clothing and food through Indian agents who often enough were not honest. The Indians continued to go on the warpath, so it was soon realized that something was still wrong. Then wiser men, who understood the Indians, decided that the race should be assimilated, that is, should be absorbed into the nation. That could take place if the tribal relations could be weakened and the Indians be treated as citizens with the same rights and privileges as white men.

In 1887 the first step toward giving citizen's rights was made by the passage of the Dawes Act. By this act reservation land in their own right was given to Indians on certain conditions. Such Indians were declared citizens of the United States and of the state in which they lived. The Dawes Act also granted citizenship rights to any Indian who adopted the habits of civilized life and separated from, and lived apart from, any tribe. In 1906 the Burke Bill took a step backward by providing that Indians taking allotted land should not be declared citizens until after twenty-five years had elapsed.

INDIANS NOW HAVE EQUAL RIGHTS WITH WHITE MEN AS CITIZENS

But the act of 1924 has smoothed out all the old difficulties, and Indians are now on the same footing as white men as regards rights of citizenship.

That such an outcome of the Indian problem has been possible is due largely to the efforts of the Bureau of Indian Affairs, which has stood as a kind of guardian to the race. We must go back to the early history of the relations between the colonists and the Indians to explain the necessity for a governmental department to look after Indian interests. Almost in the beginning of the colonial period trading with the Indians became a lucrative enterprise, for the white man and the spread of trade brought a large number of tribes into contact with the French and English, both nations striving to make allies among the Indians. This rivalry was one of the causes of the French and Indian War. Traders were used by both French and English to gain the good-will of the Indians and to hold their friendship.

When the Revolution began it became a matter of vital importance whether the Indians would join the English or the Americans in the struggle for independence. One of the means used by the Revolutionists was the appointment of agents to live among the Indians located near the settlement, watch their methods and the actions of British sympathizers, and through the maintenance of trade se-

LIVING AS THEIR FATHERS LIVED

Here we have a typical pueblo home such as is common in the southwestern states. The walls of pueblo dwellings consist of small flat stones laid in adobe mortar, large balls or bricks of adobe, or a double row of wattling filled in with clay.

This photograph shows the interior of a Blackfeet tepee on the Glacier National Park Reservation. Mrs. Three Bears, Jenny Many-Tail-Feathers and Chief Three Bears are about to partake of a meal cooked in good old Indian fashion.

Photos, Ewing Galloway.

cure the good-will of the Indians toward the American colonists. And as the war went on, the trading-post became a military headquarters. When the War Department was created by Congress under the act of August 7, 1789, its duties included those "relative to Indian affairs."

BUREAU OF INDIAN AFFAIRS ORGANIZED IN WAR DEPARTMENT

A Bureau of Indian Affairs was organized in the War Department on March 11, 1824, with Thomas L. McKenney as its chief. Among his duties were: the administration of the fund for the civilization of the Indians, under regulations established by the department; and the examination of the claims arising out of the laws regulating the intercourse with Indian tribes. By the act of July 9, 1832, there was created in the War Department the office of Commissioner of Indian Affairs. Subject to the Secretary of War and the President, this commissioner should have "the direction and management of all Indian affairs and all matters arising out of Indian relations."

On June 30, 1834, an act was passed "to provide for the organization of the Department of Indian Affairs." When the Department of the Interior was created by the act of March 3, 1849, the Bureau of Indian Affairs was transferred thereto, and hence passed from military to civil control.

One hundred years ago the Government had dealings only with the tribes that lived east of the Mississippi River. Up to 1824 it had entered into treaties with a few tribes only. Five years before the Bureau of Indian Affairs was organized in the War Department, Florida had been ceded to the United States by Spain, and the Indians of that state had come under the jurisdiction of the United States Government. Indian hostilities figured largely in the reports of the War Department of those days.

INDIAN TERRITORY ESTABLISHED WEST OF THE MISSISSIPPI

The removal of Indians residing east of the Mississippi to reservations west of that river was a policy adopted at an early date. The first official notice of it appears in the act of March 26, 1804, "erecting Louisiana into two territories, and providing the temporary government thereof." By treaty with the Choctaw in 1820 they had been assigned a new home in the West, to include a considerable portion of western Arkansas, with all that part of the present Oklahoma south of the South Canadian and Arkansas rivers. In 1825 President Monroe reported to the Senate a formal "plan of colonization or removal" of all tribes then residing east of the Mississippi to the same general western region. In accordance with this plan the present Oklahoma, with the greater portion of what is now Kansas, was soon after constituted a territory, under the name of "Indian Territory," as a permanent home for the tribes to be removed from the settled portions of the United States. Most of the northern portion of the territory was acquired by treaty purchase from the Osage and Kansa.

An unoccupied district near the centre of the territory, known as Oklahoma, became the subject of controversy with intruding white settlers, and was finally thrown open to settlement in 1889. In 1907 the whole of the former Indian Territory was created into a single state under the name of Oklahoma.

When the Department of the Interior took over the management of the affairs of the Indians in 1849, the Indian country of the United States of America had expanded to the Pacific coast, because in 1846 Mexico, by the treaty of Guadalupe Hidalgo, ceded the far-western and southwestern part of the country, bringing under United States jurisdiction the tribes of New Mexico, Arizona, Nevada, California, Utah, and parts of Wyoming and Colorado. In the same year the title to what was known as the "Oregon Territory" was established, adding to Indian responsibilities the tribes of Washington, Oregon and Idaho. The "forty-niners" had also started their rush across the continent to the gold-fields of California, and the western red men had gone on the warpath all over the plains. The attention of the Government was focused almost entirely upon the protection of the gold-hunters and of the settlers who were passing continually to the West.

FIRST EDUCATION OF INDIANS WAS THROUGH MISSIONARIES

Very little had been done up to this time by the Government along lines of education, welfare or civilization, except to contribute comparatively paltry sums to the mission schools supported and maintained by churches. In 1820 the President was authorized to apply $10,000

WHERE BRAVES HAVE HEARD THE LAND CALL

Here we see full-blood Flathead Indians hauling and stacking oats on John Charlie's ranch in Montana. This ranch is on irrigated land. Photo, Ewing Galloway.

The Blackfeet in Montana work much on irrigation canals. Our photograph shows Old Iron-eater and his team employed on the construction of the Fisher Canal. Photo, Ewing Galloway.

In Arizona the Navajo tribes have turned to sheep-raising. Here we see some of Sam Grey's yearling lambs, noted for their fleece, hardy appearance and large bone. Courtesy, Department of Indian Affairs.

annually in the aid of societies and individuals engaged in the education of the Indians. In 1849 there were 16 manual-labor schools and 87 boarding and other schools under the control of missionary bodies which received this scanty aid. In 1868 the Hampton Normal and Agricultural Institute was opened to Indians and negroes by the American Missionary Association.

In the centennial year of the United States, 1876, Congress appropriated $20,000 for the support of "industrial schools and other educational purposes of Indian tribes." This appears to have been the beginning of a national effort to educate the children of Indians, for after that the Government entered upon an almost feverish activity in the establishment of strictly Government Indian schools—first day schools, then boarding-schools and industrial-training schools. In 1879 Captain (later General) R. H. Pratt opened the Carlisle Indian School at Carlisle, Pennsylvania, the first non-reservation Indian school.

Photo, courtesy American Museum of Natural History.

However modern in outlook the present-day Indians are, there are occasions still when the ancient dances are performed. Here we see a group of dancers at a tribal celebration in New Mexico.

UNITED STATES GOVERNMENT SCHOOLS GROWING RAPIDLY

At present the Government conducts 184 day schools, 61 reservation and 29 non-reservation boarding-schools, with an attendance of over 25,000 pupils. It has recently introduced a course of study which combines academic and industrial training well adapted to Indian needs and temperament. The aim is to prepare girls to become good housewives and mothers in their home communities, and to fit the boys for practical farming or to give them such elementary knowledge and practice in mechanics as will lead to skilled workmanship. At seven of the larger schools vocational training extends through the tenth grade, and at one of them is provided a thorough commercial course. In 1920 these advanced schools enrolled 5,300 students, and their graduates readily find remunerative employment in agriculture, the trades and in business pursuits. In all federal schools prominence is given to hygiene, moral conduct, religious culture through privileges extended equally to all Christian denominations, and to the practice of thrift. State public schools now enroll more than 30,000 Indian children. Over 5,000 are cared for in mission and private schools.

The central plan of the course of study for Indian schools is the doing-away with needless studies and the employment of a

HANDICRAFTS NATURAL TO INDIANS

An ancient craft. Here we see a Zuni woman making pottery out of doors in New Mexico.

A Puna woman weaving a basket. Basket-making is one of the chief handicrafts for Indian women.

The making of quaint ornaments from silver coins is one of the arts of the Navajo silversmith.

Out under the bright sun of Arizona the celebrated Navajo rugs are woven.

Upper left-hand photograph, courtesy Museum of the American Indian, New York. The other three photographs on this page, courtesy American Museum of Natural History.

natural system of teaching in industry, æsthetics, civics and community interests. The development of the all-round efficient citizen is the chief feature. So the Indian boys and girls are taught to design and make beautiful and useful things with their hands; to study and understand the practical application of the laws of nature; to apply and appreciate art in the cooking and serving of a meal, in the making and fitting of a garment, in the furnishing and decorating of homes; to design and make useful tools and furniture; to building convenient, comfortable and sanitary houses; or to make two ears of corn grow where only one grew before. The larger schools have literary societies, religious organizations, brass bands, orchestras, choirs, athletic clubs, physical-culture classes, art classes, and various other student organizations and enterprises for promoting cultural training.

Vocational training does much for Indian young people

As a result of this training there are hundreds of young men among the Indians who can, if necessary, shoe a horse and repair its harness, set a wagon tire, lay a concrete walk, and even build a respectable sort of house. There are as many young Indian women who can do any kind of housework, care for their children according to modern sanitary and hygienic practice, and give to their homes a touch of art and comfort that makes them attractive and worthy of imitation.

To promote reservation industries there are demonstration and experimentation farms. Several hundred farmers, stockmen and assistants who live near Indian communities are employed for purposes of practical oversight and instruction in modern methods of agriculture and in the upbreeding and handling of live stock. In recent years loans have been made to energetic Indians from tribal or Government funds as capital for beginning their self-support, and have generally been successful. Special attention has been given to the reclamation of arid and semi-arid Indian lands, resulting thus far in the irrigation of about 350,000 acres, with nearly 1,000,000 acres more under project, the annual increase in crop values being nearly equal to all previous cost of such development. Tribal herds of sheep and cattle have been maintained on a number of reservations with financial profit, but chiefly to encourage individual ownership and enterprise in live stock.

Educated Indians rise to prominent positions

The demand for Indian labor is greater than the supply, and good wages and good food await all Indians willing to work. In railroading, land reclamation, in telephone, telegraph and highway construction, in work in the beet-fields, in picking fruit or gathering nuts, herbs or wild rice, excellent wages can be made. The cotton-fields of the Southwest are using an increasing number of Indian pickers. Hundreds of Indian school graduates are doing well in commercial positions, and many of the young men are finding openings in automobile factories. The more ambitious and brilliant young men and women are taking university work and entering professions.

There are already Indian men and women who have won national reputation as doctors of medicine. Indians have also become senators, congressmen, lawyers, writers, artists, educators and archæologists. So there is really nothing to prevent the descendants of the once-savage warriors from becoming leaders of a different standard of civilization.

Oklahoma Indians acquire wealth through oil leases

The high prices of crude oil and the tremendous demand for the products of petroleum in past years have resulted in the search for oil in all sections of the country. Consequently leases on restricted Indian lands for oil- and gas-mining purposes are being made in practically every state where such lands are located, and oil-fields are in operation on Indian lands in Oklahoma, Montana, Wyoming and New Mexico.

In the Osage Reservation in Oklahoma 120,000 acres were offered for oil-mining lease, 62,448 acres selling for a grand total of $16,457,000. The outstanding feature in these sales was the record-breaking prices received for tracts in the famous Burbank pool, one 160-acre tract bringing $1,990,000, another $1,995,000, and each of several others selling for more than $1,000,000. The total revenue to the Osage Indians from oil and gas leases was $24,670,483.

First hospital for Indians is opened at Carlisle

When the Indians were compelled to live the restricted life of the reservation

INDIAN YOUNG PEOPLE AT SCHOOL

This is a domestic-science class of Navajo girls at the Government School, Navajo Reservation, Fort Defiance, Arizona.

At Riverside, California, is Sherman Institute, which is devoted to the vocational training of Indian young men and women. This is one of the administration buildings.

In the Bakery Department at Sherman Institute. Many young Indians have mastered this trade during the last few years.

The photographs on this page, courtesy of the Department of Indian Affairs, Washington, D. C.

the general health of the race suffered, but it was not until 1873 that organized effort was made to better this condition. In that year the Bureau of Indian Affairs established a division of medicine and education, but this was abolished four years later. In 1909, however, the medical department was revived, and now the United States Indian Service has a large health-personnel list.

Special physicians and special nurses are engaged in treating diseases of the eye, ear, nose and throat. They travel from place to place in given districts. The field dentists are also districted, and render service to pupils of Indian schools and also to reservation Indians. The duties of field matrons are many. In some respects field matrons are comparable to county nurses, but as a rule their work concerns the improvement of the homes and betterment of the educational, moral, sanitary and social conditions of the Indians. On a few of the reservations Red Cross nurses have been substituted for field matrons.

CONGRESS VOTES MONEY TO IMPROVE LIVING CONDITIONS

In 1911 Congress voted the sum of $40,000 as a special health fund to be used to relieve distress and to prevent and suppress diseases among Indians. In 1925 the sum voted had increased to $500,000. In addition, tribal funds are used for the same purpose. Slowly but surely an improvement in the general living conditions of the race has been brought about, and a great effort is being made to reduce the rate of infant mortality and to prevent disease.

The housing conditions among the different tribes vary greatly. The backward, unambitious Indian still lives in a one-room shack in a state of filth. The Indian who has been educated and is making progress has a house equal to his means, and usually this dwelling is as neat and clean as that of any white man.

The American Indian has always had a strong religious feeling. Alexander Pope described the Indian outlook in the two familiar lines:

> Lo: the poor Indian, whose untutor'd mind
> Sees God in clouds, or hears him in the wind.

That is a good description, for to the red man there were spirits everywhere. And worshiping of these spirits was done through prayer and sacrifice. Feasting and dancing were also included in some of the religious celebrations. To-day these old dances may still be seen in outlying reservations where Christianity has not reached all the residents. The report of the Indian Office shows that in 1923 there were 410 Protestant and 240 Catholic missionaries engaged in work among the Indians, and a total of 41,072 Protestant and 52,316 Catholic church-going Indians attending 991 churches. The figures do not include the five civilized tribes of Oklahoma, nearly 100,000 in number, who are largely Protestant.

THE END OF THE BOOK OF THE UNITED STATES.

Photo, courtesy American Museum of Natural History.

An Apache group in the days before the white man came to North America.

How Far We Can See When We Stand at Various Heights

1....1¼	14....5	60....10¼	130....15	600....32½
2....1¾	16....5¼	65....10½	140....15½	650....33¾
3....2¼	18....5½	70....11	150....16¼	700....35
4....2½	20....6	75....11½	200....18¾	800....37½
5....3	25....6½	80....12	250....21	900....40
6....3¼	30....7¼	85....12¼	300....23	1000....42
7....3½	35....8	90....12½	350....24¾	2000....59¼
8....3¾	40....8½	95....13	400....25½	3000....72½
9....4	45....9	100....13¼	450....28	4000....83¾
10....4¼	50....9½	110....14	500....29½	5000....93½
12....4½	55...10	120....14½	550....31	5280....96

The first figure is the height in feet, up to a mile; the second is the rough distance seen in miles (not exact to small fractions).

HOW FAR CAN WE SEE?

CONTINUED FROM 7032

WHEN we say that our eyes see, all we really mean is that light has entered them and has affected them. If that happens, we see. It does not matter whether the light has been produced by a match that someone has held in front of our eye, or whether the light has come from a star so distant that its light took ten thousand years to reach us. In either case, if light enters our eye in sufficient quantity to affect it, we see. The answer to our question, therefore, is that our eyes can see to any distance from which light can reach them. The question whether the light has traveled billions and billions of miles, or only half an inch, makes not the slightest difference to our eyes.

It is quite a distinct question at what distance our eyes can distinguish the details of a particular thing. This depends on many things, but it can be reckoned to some extent, and it is very important to do this for the case of different telescopes.

We know that if there were any building on the moon as large as some of our big office structures, it could be recognized in our best telescopes.

Standing at any given point, we can usually see what is called the horizon, from the Greek word *horos,* which means "boundary," and in this case means the boundary between the earth and the sky. We understand, of course, that the line we see on the horizon is not really the boundary between earth and sky, but merely the boundary between them as they appear to our eyes.

As we stand by the seashore the sky and the sea seem to meet. We can see a line which seems to be the end of the sea and the bottom of the sky. That is the horizon. Similarly, if we stand on a plain of land we can, if there are no trees or houses in the way, see where the end of the land seems to touch the bottom rim of the dome we call the sky. That also is the horizon.

Its distance depends on how high our eyes are from the level of the sea if we are looking across the sea, or from the level of the land across which we are looking if we are looking over a plain.

A boy standing on the shore looks out on the sea from a distance about four feet higher than the level of the sea—the height of his eyes from sea-level. He can see just a little more than 2½ miles in front of him, and his horizon is just this distance

away. The eyes of a boy on the edge of the cliff, on the other hand, are 100 feet above sea-level, and he can see about 13¼ miles off, and that is where the horizon is. Again, the top of a lighthouse is 150 feet above sea-level, and if a boy looks out on the sea from this point he would see about 16¼ miles, and his horizon would be 16¼ miles away.

The scientific explanation of all this would be that "range of vision is determined by the altitude of the observer." In simple language this means that the higher up we are, the farther we can see. That is because our world is a globe. Perhaps we can understand better how this is if we stand in front of a row of houses forming a bulging crescent. Let us stand close to one of the houses and turn our heads first to the right and then to the left. We cannot see much of the row of houses—perhaps only a little bit of the house on each side of the one in front of which we are standing. We step back into the middle of the street and look again. Now we can see a good many more of the houses, but still not all, if the row is long. Then we cross to the far side of the street, and many more will come within range.

To look for the horizon is much the same thing. The earth is round, and the farther we are above the ground along which we are looking, the farther we can see. The table on the preceding page shows how far anyone can see at various distances from the earth's surface. At one mile high we can see 96 miles. The figures are generally correct, but not quite exact, as the table is drawn up for simplicity, and so avoids small fractions.

WHY ARE SOME PEOPLE DARK AND SOME FAIR?

If we examine with a microscope the structure of the skin of animals or human beings, we find that it is made up of numbers of cells arranged in layers. Among these cells are found coloring matters, or pigments, as the artists call them; and it is the quantity of this coloring matter present in any individual which causes the complexion to be called fair or dark. In very fair people there is very little pigment; in very dark people, with brown eyes and black hair, there is a great deal of pigment; while others with not very much pigment are neither very fair nor very dark. This pigment continues to be produced for many years; but when it ceases the hair becomes gray. We see this more easily in dark people.

HOW DID ALL THE METALS GET INTO THE EARTH?

If this question had been asked a few years ago, no one could have made any better answer than that the various metals were in the stuff from which our earth was formed years ago. By some chance or other they just settled down in the earth's crust—one here and one there. But geologists have made us give up forever ideas of this kind.

We are beginning to understand that change is going on everywhere. This is true of worlds; it is true of plants and animals; it is true of nations and their ways; and it is true even of the atoms of the elements. So now, when we find gold, silver, lead, or whatever it may be, in some part of the earth's crust, we inquire into the history of the particular metal.

For instance, we have little doubt that all lead is the result of a long series of changes that began in an element called uranium. Stages in between uranium and lead are represented by the element called radium and the beautiful and precious metal we call silver. Probably before very long chemists will be able to work out the history of many metals and even foresee what will happen to them.

WHY ARE SOME FLOWERS SWEETER AT NIGHT?

To produce seeds many plants need pollen from the flowers of another plant. This pollen is sometimes carried by the wind and sometimes by insects. Nature has used great ingenuity to attract certain insects to certain flowers. Some of them she shapes or colors attractively; some she renders attractive by honey, and some by scent. In one way and another all sorts of insects—beetles, earwigs and butterflies—are attracted, and, clinging to flowers, they carry fertilizing pollen from one to another.

The flowers that become specially fragrant at night give off their fragrance usually to attract moths, which fly only at night. It is strange that these flowers should give off fragrance just at the right time to tempt the moths, but it is evidently a case of selection by survival of the fittest. The flowers which failed to grow fragrant at night would not attract moths to fertilize them, and so would have no seeds and would die out.

THE END OF THE BOOK OF WONDER.

WORLD MAP OF THE FOOD PLANTS: FRUITS, NUTS AND CEREALS

THIS MAP SHOWS THE CHIEF PLANTS YIELDING FOOD FOR MAN, AND WHERE THEY GROW

FRENCH—THE OLD APPLE WOMAN

First line, French; second line, English word; third line, as we say it in English.

Un jour Georges alla promener son chien. Il rencontra un garçon boucher.
One day George went to walk his dog. He met a boy butcher.
One day George took his dog out for a walk. He met a butcher's boy.

Il portait de la viande sur un plateau. Pat sauta et vola un gigot.
He was carrying of the meat upon a plate. Pat jumped and stole a leg of mutton.
He was carrying some meat on a tray. Pat jumped up and stole a leg of mutton.

Pat décampa dans la rue. Georges courut après Pat et le garçon après Georges.
Pat decamped into the street. George ran after Pat and the boy after George.
Pat bolted down the street. George ran after Pat and the boy ran after George.

Un petit garçon traversait la rue avec une grande boîte sur la tête.
A little boy was crossing the street with a large box upon the head.
A little boy was crossing the street with a big box on his head.

Le méchant Pat courut à lui, le fit tomber, et renversa la boîte.
The naughty Pat ran to him, him made to fall, and upset the box.
The naughty Pat ran up to him, knocked him over, and upset the box.

L'enfant était très furieux. Il se releva et suivit Pat pour le frapper.
The boy was very furious. He himself recovered and followed Pat for him to strike.
The boy was very angry. He picked himself up and ran after Pat to hit him.

Pat courut jusqu'à ce qu'il arrivât à une femme qui vendait des pommes.
Pat ran until this that he arrived at a woman who was selling some apples.
Pat ran on till he came to a woman selling apples.

Pat fit tomber la corbeille de la femme et les pommes roulèrent sur la chaussée.
Pat made to fall the basket of the woman and the apples rolled upon the roadway.
Pat knocked over the basket and the apples fell out into the road.

La femme se releva et jeta la corbeille au chien. Pat était enfin attrapé.
The woman herself recovered and threw the basket at the dog. Pat was at last caught.
The woman picked herself up and threw the basket at the dog. Pat was caught at last.

On le conduisit à la maison et son petit maître le punit de sa fredaine.
They him conducted to the house and his little master him punished of his frolic.
He was taken home and his little master punished him for his prank.